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FOOD
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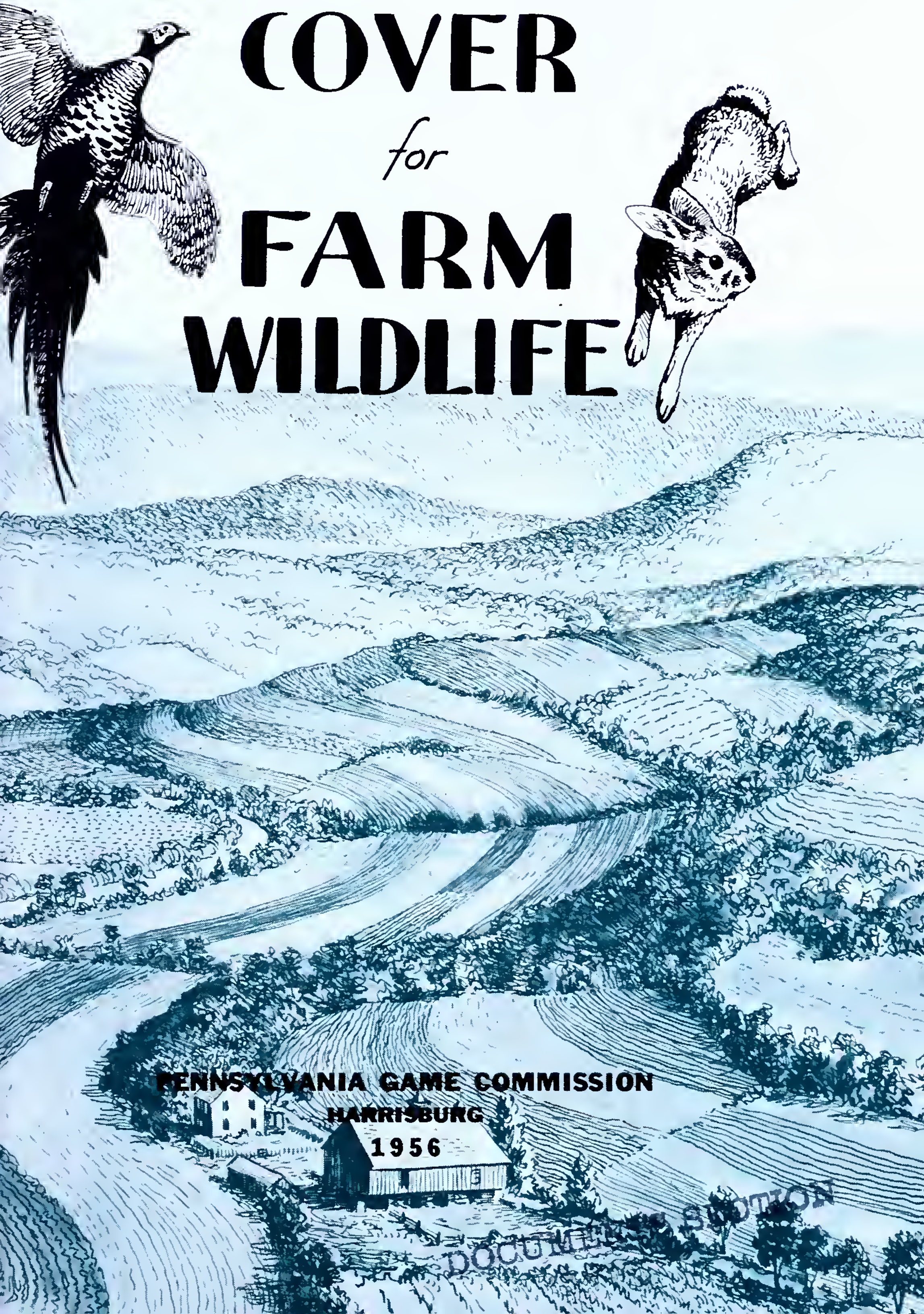

PENNSYLVANIA GAME COMMISSION
HARRISBURG
1956

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FOOD AND COVER

FOR

FARM WILDLIFE

By

JOHN B. SEDAM

●

1956

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his bulletin, made available for free distribution as a conservation education service, is revised and somewhat condensed edition of Special Issue No. 6, *Pennsylvania Game News* official monthly publication of the Pennsylvania Game Commission) March, 1953. Mr. edam at the time of original publication was Supervisor, Food & Cover Section, Land anagement Division. Since then he has become Chief, Division of Minerals, Pennsylvania ame Commission.

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FOOD AND COVER FOR FARM WILDLIFE

Introduction

Interest in outdoor recreation, wildlife preservation and all phases of conservation has increased during the past two decades. This has been the result of stepped-up production in our factories, shorter working hours, better highways and transportation.

Improved firearms and increased hunting pressure have caused increased harvests of game. Changes in agricultural practices, including the introduction of high speed mowing machines and more intensive farming, have combined to reduce the amount of wildlife, and the food and cover which is required to provide it with homes.

Most sportsmen recognize these changing conditions. Some are content to accept a smaller bag of game while others recognize their obligation to future generations, and wish to do something to improve food and cover for our furred and feathered friends. Those that can be of assistance in this worthwhile program need, and are constantly seeking, guidance.

The necessity of wildlife improvement on farm and woodlot areas has long been recognized by the Pennsylvania Game Commission. Since 1930 interest has steadily increased in the application of development practices to provide better homes for game birds and animals, as well as song and insectivorous birds. Nature must be helped. The program was given added importance and financial support when the 1949 Pennsylvania Legislature increased the hunting license fee, and specified that $1.25 from each resident hunting license must be utilized to improve food and cover for wildlife, and to purchase and distribute game to restock hunting areas.

Sportsmen and private individuals can do their share in this common task by improving natural habitat, planting and distributing supplemental food for wildlife. These activities on club grounds, dog training areas and private farms will do much to increase the game supply, and at the same time make those that cooperate realize the need for whole-hearted participation.

Wildlife ON THE FARM

Conservation plans for farms take into consideration the importance f all wildlife, and designate practices that will improve the food and over for game, song and insectivorous birds.

Game species include Ring-necked pheasants, bobwhite quail, cottontail rabbits and squirrels, which are commonly found on farm and woodlot areas. Today even deer, wild turkey and ruffed grouse, although not considered farm game, are present throughout many farming regions. All these game species, plus raccoons and the common groundhog, provide hunting for farmers and sportsmen alike. Following are pictures of the more important game birds and animals, common furbearers and a few of the song and insectivorous birds found on the farm.

RING-NECKED PHEASANT

These game birds do best where there is intensive agriculture, with marshes and swamps nearby.

They feed upon waste grains, weed seeds, insects (grasshoppers, Japanese beetles, corn borers, etc.), fruits of shrubs and vines and various greens derived from native plants and farm crops such as clover.

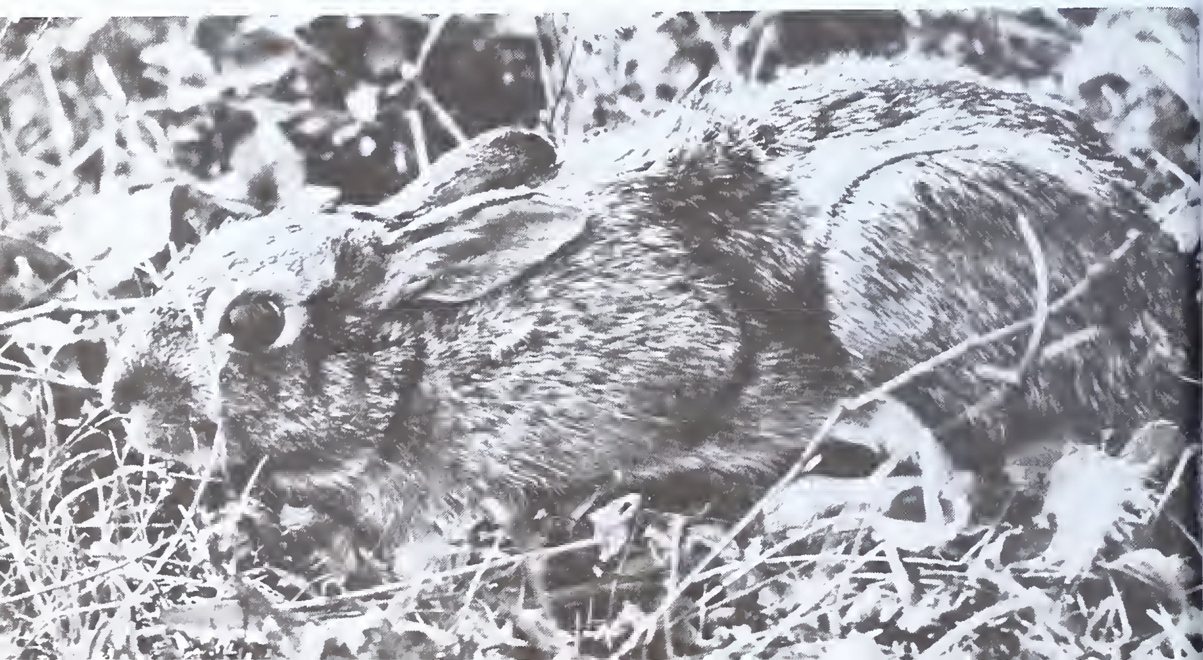
BOBWHITE QUAIL

Bobwhite Quail thrive best on marginal farms, with heavy fence rows and other good cover thickets. Waste grains, berries from shrubs and vines, insects, succulent green leaves, and an abundance of weed seeds provide the food they need.

COTTONTAIL RABBIT

These game animals thrive on most farmland, but require seasonal foods—clovers, grasses, grains and native green plants in the spring and summer; palatable sprout growth, bark of shrubs, and apple limbs, and green forage in fall and winter.

Grassy fields for nesting, standing grain, thickets, brush piles, swamp areas and evergreen plantations provide the required cover.



FOX SQUIRREL

Woodlots and forests provide homes for squirrels. The fox squirrel prefers large timber in farm woodlots. Nuts, acorns, fruits and buds from native trees, shrubs and vines, and corn are their most important foods.

RACCOON

Raccoons live in hollow trees, rock dens and holes in woodlot and forest areas.

Their principal foods include fruits of trees, shrubs and vines, birds' eggs, corn and other grains. When foraging along streams they feed upon carrion, frogs, crayfish and mussels.

CHAPTER I

Food and Cover for Wildlife on the Better Agricultural Areas

The majority of readers recall past years when good game cover on farms was more plentiful than at the present time. They are aware of the serious water shortages in rural areas, brought about by lowering of the underground water level. Deep gullies in many fields, and even piles of soil washed out on macadam roads, have been observed after heavy rains.

But how many people have considered the reasons for this decline in wildlife cover, reduction of water supply, and even more serious the loss of soil—the basis of all life? They are very simple, namely: improper farming and general misuse of entire watersheds. What can be done to remedy these conditions?

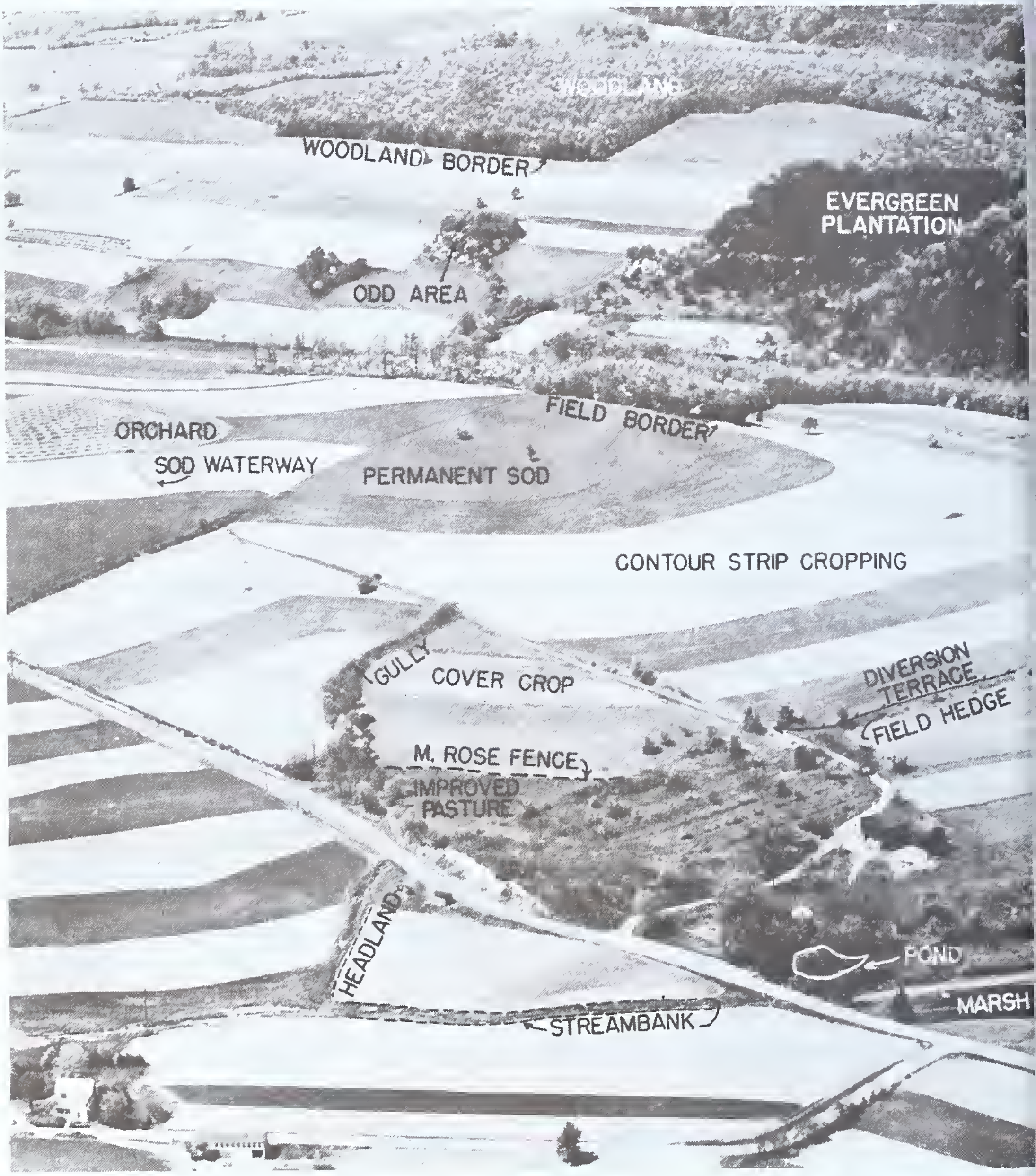
Conservation farming is an attempt to correct these mistakes by contour strip cropping and full rotations on the better field areas; planting trees, shrubs, vines, clovers and grasses to stabilize soil and retain water on very steep slopes and gullies; and managing woodlots to protect the watershed. Through proper land use the humus content of the soil will increase, the water level will rise and the land will produce crops and natural growth that attract, feed and protect farm wildlife.

The farmer will enjoy greater income from improved crops, his land will be more valuable, and wildlife will be present in ever increasing numbers.

The importance of proper land use cannot be stressed too emphatically. Farmers in every county of Pennsylvania have recognized the need for conserving the soil, and have adopted farm practices such as contour strip cropping, protection of gullies, streambanks, etc., in an effort to improve the land for future generations. The accompanying picture of conservation farming clearly depicts the application of these practices, as they may be applied to the average farm. Soil conservation districts, organized locally by the farmers in cooperation with the State Soil Conservation Commission, are expanding and providing landowners with land-use plans and services from all cooperating agencies. Advice from county agricultural agents has also stimulated conservation on farms in Pennsylvania. Future Farmers of America, 4-H Clubs and other farm groups are becoming conservation conscious. Even the Boy Scouts of America have a splendid merit badge booklet on conservation.

Following an approved farm plan, the better fields are contoured and stripped to prevent erosion, then rotated to various farm crops. Field hedges are planted on slopes between crop strips and above or below diversion terraces to help reduce water runoff. Gullies are seeded to permanent grasses and planted with game food producing trees, shrubs and vines. Designated slope fields are seeded with permanent grasses and clovers. Odd triangles and rough rocky outcrops are planted to perennial grasses and shrubs. Pastures are improved by applying lime, fertilizer and seasonal mowing. Woodlots are fenced to prevent pasturing and to protect reproduction. Timber is harvested on a selective basis. Streambanks are fenced and planted with shrubs to stabilize soil and reduce erosion. Living fences of multiflora rose are planted between pastures and field strips. Woodland borders are improved by cutting large shading trees along the field edges, thus increasing the acreage of productive land. One can see that most of these land-use and conservation measures, in addition to increasing production of farm crops, will have a direct effect on wildlife by improving food and cover conditions for it.

Conservation Farming



A land-use plan for the typical farm takes into consideration all practices that will conserve the soil, protect the water supply, and, through application of correct rotation farming, increase the yield of field crops. This is the farmer's first consideration.

Wildlife will benefit from these conservation farming practices, by taking advantage of improved food and cover conditions.

FARM CROPS provide FOOD and COVER for WILDLIFE

FIELD CORN

WHEAT

Standing fields of corn, small grains including oats, wheat, rye and barley, followed by various clover and grass seedings, supply grains and succulent greens required by birds and animals. Soybeans, buckwheat and other farm crops are also important foods.

Nesting cover in the form of permanent grass fields that are not mowed until late summer, is necessary for farm game to reproduce and repopulate the land. The value of growing crops as summer cover cannot be overlooked.

CLOVER

BUCKWHEAT

CONSERVATION PRACTICES FOR PROGRESSIVE FARMS

Progressive farmers are improving their lands by following recommended conservation plans. The following pages with illustrations, show how these practices conserve soil, water and forests and at the same time improve food and cover for wildlife.

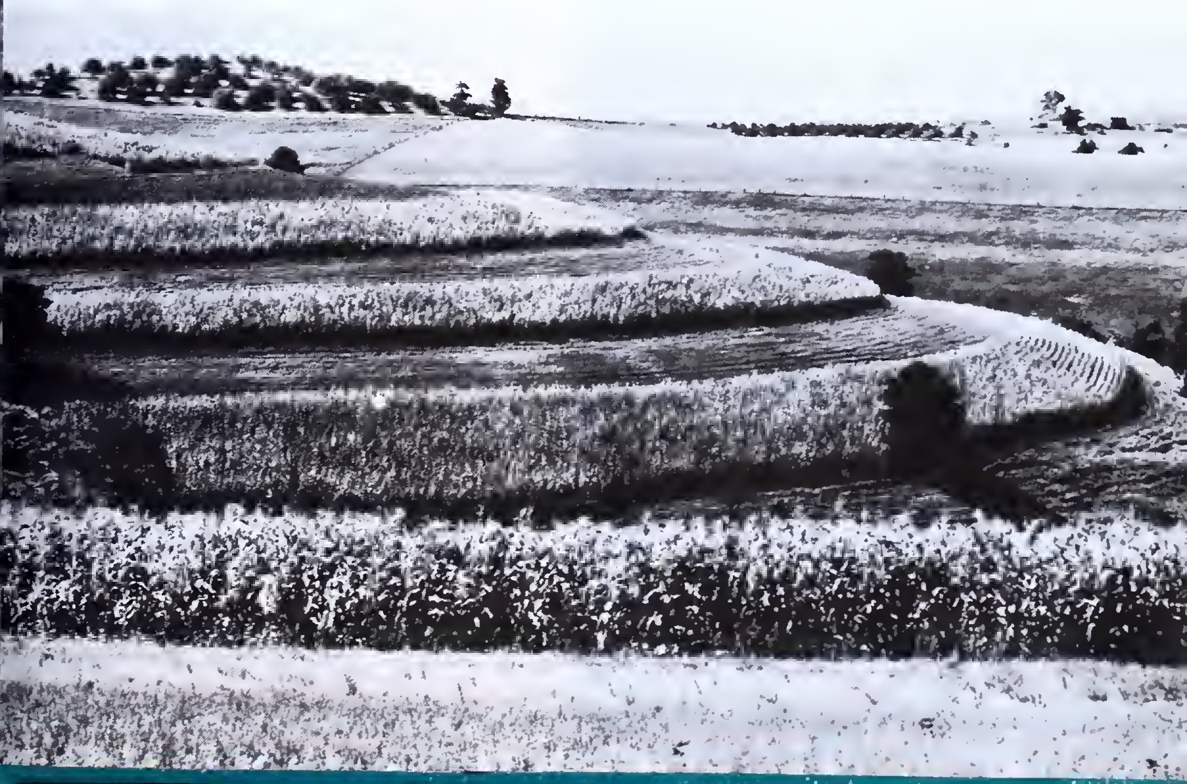
Cultivated Fields

(CONTOUR STRIP CROPPING)

Fields are protected from erosion by surveying or "laying out" strips of land from 70 feet to 100 feet wide, depending upon the degree of slope. By using a surveyor's level, the edges of these field strips will be level.

Erosion is then reduced by alternating strips of close-growing crops such as clover and grasses, with corn and cultivated row crops. Farm machinery operates on the level and is less costly to maintain.

Here corn is protected by strips of sod. This variety of vegetation on the same field assures continued food and cover for farm wildlife throughout summer and early fall.



FIELD HEDGES

Field hedges or hedge rows are shrub plantings often located between contour strips of crop land. Usually 8 to 10 feet wide, these strips planted to multiflora rose, regel privet, hazelnut, tatarian honeysuckle and other shrubs, spaced 4 feet apart, provide protection against soil loss and water runoff. Hedges may also be located above or below diversion terraces to give added soil protection.

Hedges are utilized by wildlife as travel cover between woodland and field areas. As the shrubs mature, natural foods in the form of nuts, berries and fruits become available. Much of this food is utilized by wildlife during winter months.

LIVING FENCES

(Multiflora Rose)

The multiflora rose or living fence, usually between pasture and crop land, is a hedge and must be managed as such. Experts recommend that 1 year old seedlings be planted 1 foot apart in a single row. These plants are very thrifty and within 5 years, if properly planted and protected, will provide excellent wildlife food and cover.

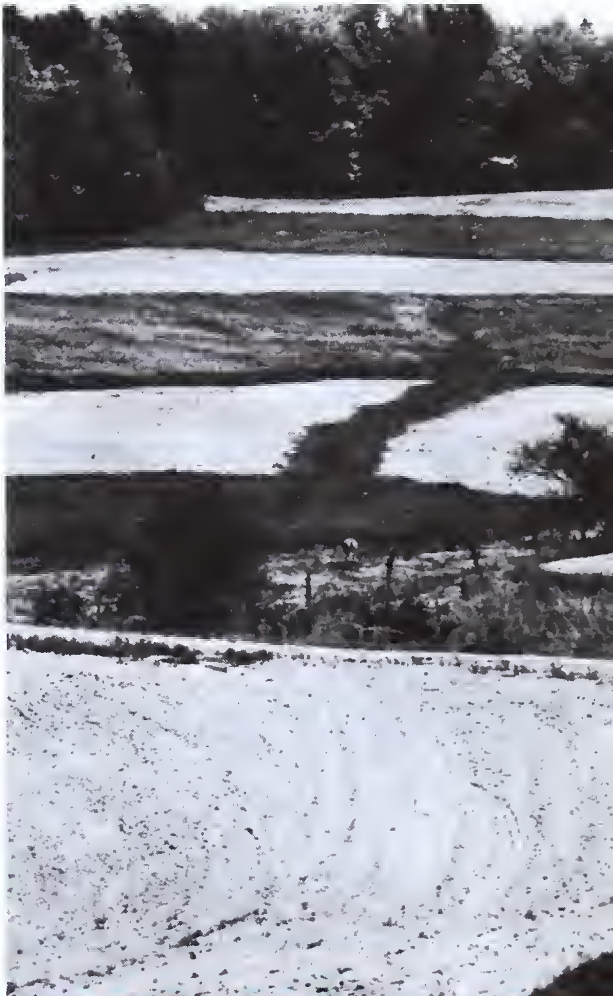
IMPROVED PASTURES

Rough open fields, unsuited to agriculture, are limed, fertilized and disced to improve them for pasture. Often the fields are seeded with a locally recommended grass-clover seed mixture. Wildlife feeds upon the succulent clover growth.

SOD WATERWAYS

Natural drainage ditches or depressions which carry water across cropland during rains are not plowed, but must be protected from erosion by seeding to a grass-clover mixture. Reed canary grass, timothy, tall oats grass, alsike and sweet clover, seeded at the rate of 25 pounds per acre furnishes a very good sod. Fertilizer and lime applications improve the seeding.

Since sod waterways go up and down hill, they provide travel cover for wildlife to use when moving from one field strip to another.



COVER CROPS

Winter cover crops such as rye grass seeded in corn, potatoes or other row crops after the last cultivation, provide green growth and cover which protects the soil from erosion. Sweet clover, millets and other cover crops planted in orchards are equally beneficial. Until such time as they are plowed under for green manure or are harvested, these cover crops furnish food and protection for wildlife.

DIVERSION TERRACES

Diversion terraces are shallow broad ditches established across sloping fields to divert heavy water run-off and protect the fields below from erosion. Terraces are constructed on a very slight grade and are protected on the upper side by a sod filter strip approximately 40 feet wide.

The terrace and filter strip are seeded to a permanent type grass-clover mixture and mowed to maintain a tight sod.

They serve as travel lanes for wildlife to use when moving from one woodland to another.

HEADLANDS

Headlands are areas at the ends of the fields where farmers turn their equipment. Usually they are shaded or have poor growth due to erosion. When planted to sericea lespedeza, Korean lespedeza or a mixture of permanent grasses, these areas are protected and produce food and cover to attract wildlife.

FIELD BORDERS

Field borders are narrow strips of farm land located along the edges of woodlots or fence rows. Large trees often shade this area and crop growth is very poor.

These borders of unproductive land, usually 25 to 35 feet wide, are often retired from crops by planting low growing shrubs such as bicolor lespedeza, seeding to sericea lespedeza or permanent type grasses and clovers. (See Planting Instructions—back of this issue.)

Farm wildlife will be sure to find these protective plantings.

WINDBREAKS

Windbreaks are rows of evergreen trees and shrubs planted north and west of farm buildings to provide protection from prevailing winds.

By planting at least two rows of Norway spruce, Austrian, red, scotch or white pine at 8 x 8 feet spacing in the center, and bordering the evergreens with two or more rows of Amur privet, Tartarian honeysuckle, or other shrubs spaced 3 to 4 feet apart, an effective windbreak will be established.

Like other plantings of this type, these windbreaks will be populated by many species of wildlife. The evergreen trees furnish cover, and the fruits produced by shrubs provide food.

MANAGED ORCHARDS

Many farmers maintain small orchards, either to supply the family with fruit or to provide a cash crop.

Cover crops such as sweet clover, ryegrass and millet, are usually planted to protect and improve the soil. Pure ladino clover is often seeded and maintained as a permanent sod cover in apple orchards. These crops increase the value of the orchard and produce food and cover for wildlife.

Fruits which fall to the ground, and branches pruned during the winter, will be eaten by cottontail rabbits. Piles of branches provide additional protective cover.

ERODED GULLY

GRASS AND SHRUB PLANTINGS REDUCE GULLY EROSION

GULLY PLANTINGS

Gullies are formed over the years by erosion, and are present on most farms. Grass-clover sods may be established in shallow gullies to give immediate control, while shrubs and woody plants mature. Any of the recommended permanent grass-clover mixtures or lespedeza may be seeded for this purpose.

Some of the woody plants which are utilized for general gully control are Tatarian honeysuckle, bayberry, coralberry, black haw, silky dogwood, elderberry and vines such as fox grape, Virginia creeper and bittersweet. Seedlings may be spaced 3 x 3 feet or closer to encourage quick control. In very deep gullies banks pine, Virginia pine and black locust may be planted near the bottom.

These gullies form thickets of woody vegetation and are utilized extensively by farm wildlife.

ODD AREA PLANTINGS

Rock out-crops, sink holes and old foundations are odd areas which may be planted to trees, shrubs and vines. Flowering dogwood, highbush cranberry, red pine, Norway spruce, black haw, arrowwood, silky dogwood, gray dogwood and fox grape are a few of the species normally planted at these locations. In addition to correcting an eyesore on the farm, they provide food and cover for wildlife.

EVERGREEN TREE PLANTATIONS

Many farmers plant steep hillsides to evergreen seedlings. When purchased from commercial nurseries and planted during successive years, Norway spruce, Austrian pine, red pine, Scotch pine and white pine will develop into Christmas trees which provide an annual cash crop for the landowner. The hillsides furnish excellent wildlife cover.

FARM PONDS

Thousands of small ponds have been constructed on farms in Pennsylvania. Since most of these serve as fish ponds, and provide fire protection near farm buildings, there has been limited utilization by waterfowl. However, some of the larger areas provide resting areas as well as food and cover for wild ducks and geese. Additional waterfowl foods may be planted along the shorelines. (See Planting Information—back of issue.)

Wet area shrubs and vines, planted to beautify ponds, provide homes for all farm wildlife.

MARSH AREAS

These wet areas provide homes for wildlife when planted to reed canary grass and wet site shrubs, including silky dogwood, basket willow, red-osier dogwood and highbush cranberry. Where there is sufficient water, marshes may be planted to waterfowl foods.

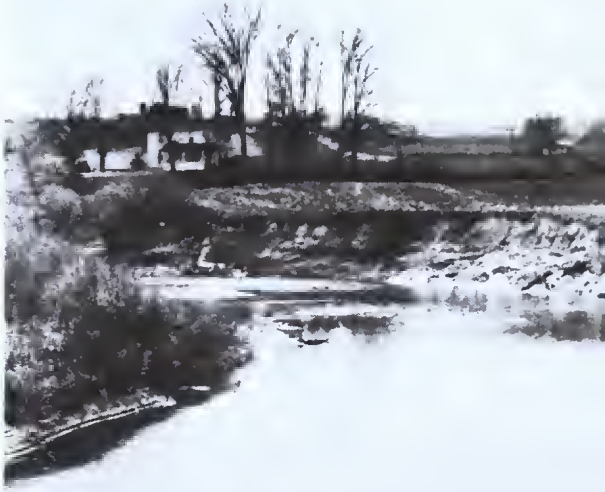
Farm boys trap many muskrats and mink from farm ponds and small marsh areas.

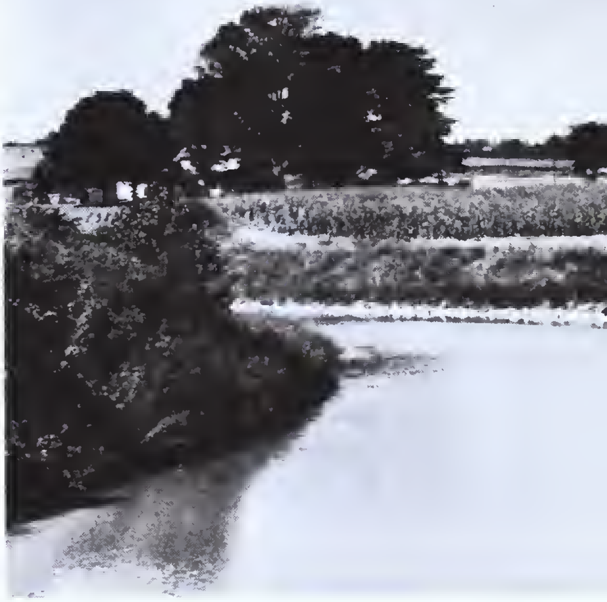
STREAMBANK PLANTINGS

Unprotected streambanks erode and soil is lost during periods of heavy floods.

To correct this condition, streambanks are graded, then planted with red-osier dogwood, silky dogwood, and basket willow spaced 3 feet apart. The banks are then covered with brush mats for protection from washing. The mats are held in place by driving willow stakes into the soil and stretching wire between stakes. The resulting cover reduces loss of soil and provides a home for wildlife.

A well covered streambank adds much to the value of the farm.





WOODLAND BORDERS

Woodland borders usually support tall trees that shade the crop land. By cutting and felling these larger trees more crops are grown, and the remaining shrubs and vines are stimulated to produce good cover and more fruits. Resulting sprouts and new reproduction also add to the value of these woodland edges. Trees, usually felled for a width of 30′ along the border, may be sold to local timbermen or used on the farm. Tops are piled on the cut area to provide cover for cottontail rabbits. Income from sale of forest products will usually finance the operation.

Practically all trees, shrubs and vines shown in the front of this issue will be found growing naturally along woodland borders.

WOODLANDS

Timber on woodlot areas must be managed to provide lumber for use in farm building repairs, and to provide a supplemental income for the landowner. By proper selection, mature timber may be utilized and the remaining tree growth improved.

Removal of trees will allow sunlight to reach the forest floor, and stimulate sprout growth and reproduction of blackberry, raspberry, flowering dogwood, thornapple, sumac, witch hazel, ironwood, fox grape and greenbriar, all of which produce food and cover for wildlife.

When removing timber from the woodlot, reserve several hollow trees per acre to provide dens for raccoons, squirrel and cavity nesting birds.

TIMBER SALES

Timber in woodlots should not be sold in a haphazard manner. Sales should be planned in advance. Land-owners often receive advice from local district foresters before obtaining bids covering removal of timber from the woodlot.

The owner should control timber operations, either by selling specific trees which are marked, or limit the cut to species and minimum diameters.

Larger timber (usually over 12 inches in diameter at breast height) may be sold for sawlogs. Smaller trees are marketed as paperwood, mine props, posts, chemical wood, etc.

Usually there is a local market for forest products. Farmers manage woodlots the same as any other crop.

Special Wildlife Practices

In addition to the many conservation practices previously described there are many special activities on the farm that will directly benefit wildlife. A few of these are shown on the following pages.

STANDING CROPS FOR WINTER FOOD AND COVER

Wildlife must survive severe winter weather. By allowing a few rows of corn along field edges to remain standing over winter, the landowner supplies supplemental food and cover which may mean the difference between an abundant or limited game supply.

FOOD STRIPS

On many farms there are small isolated narrow fields on which it does not pay to raise crops. On these areas sorghum, millet, sunflower and other grains may be planted to provide food and cover for wildlife. Sportsmen often supply the seed and assist farmers in establishing these food strips.

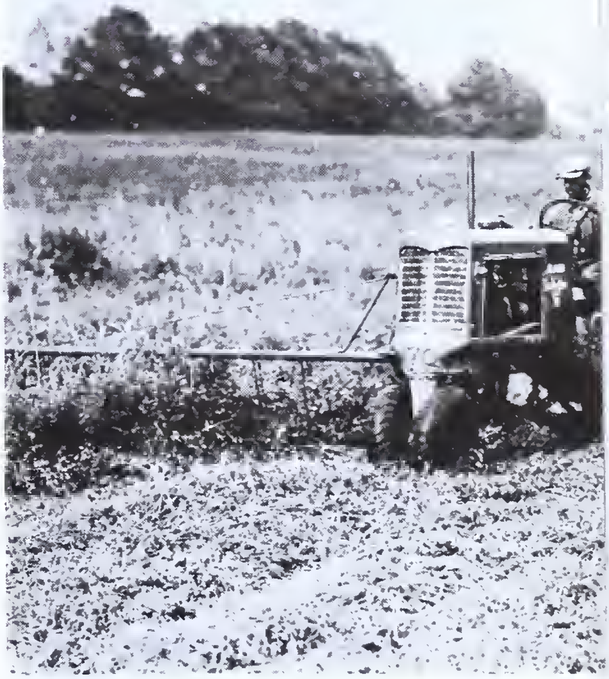
(For additional planting information, see back pages of this issue.)

SAVE NESTING WILDLIFE

Ringneck pheasants and bobwhite quail nest in hay fields. Each year many are lost and the eggs destroyed during mowing season. The greatest mortality of most wildlife occurs during the summer.

Farmers are urged to allow islands of hay to stand around nests which have been located.

Flushing bars are now available for fast moving farm machinery. Some success has been reported from the use of the Ohio flushing bar. These bars, located ahead of the mowing blade, will flush the hen bird and allow the farmer to locate and save the nest.



PREVENT FIELD FIRES

Humus and nutrients essential to farm crops are destroyed by ground fires. In addition, wildlife perish in these blazes or have their young and future homes destroyed. Prevent fires, improve your soil and save wildlife.

ATTRACT SONGBIRDS

Many farm families enjoy the color and activities of songbirds outside their dwellings. During winter months they can attract and hold a variety of these feathered friends by establishing small feeders in nearby shrubbery.

CORNSHOCKS AND WILDLIFE

An occasional shock of corn left standing against a fence or along woodlot edges may save a covey of quail.

Scratch grain or sweepings from the barn floor, along with a supply of grain or fine gravel, should be placed under the protected side of corn shocks to provide additional food.

FIELD EDGE PLANTINGS

Interested landowners may supply additional food along hedges and field edges by planting a few handfuls of broom corn, amber sorghum or sunflower in the outside corn rows.

TREES, SHRUBS *and* VINES *provide* *Essential Wildlife Foods*

FLOWERING DOGWOOD

ELDERBERRY

BLACKBERRY

WILD PLUM

These pages show the fruits and growth of a few trees, shrubs and vines which provide food for wildlife.

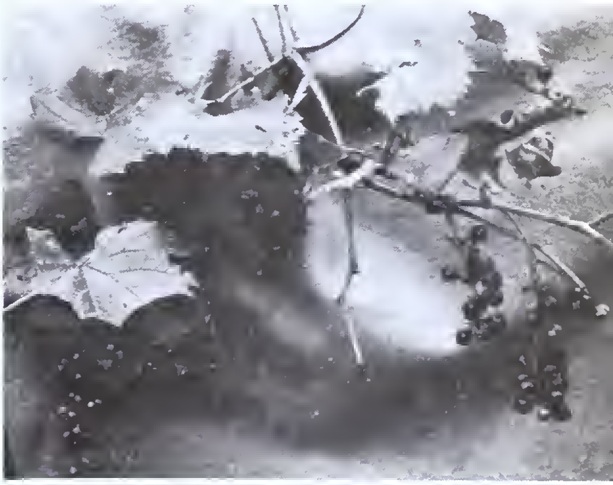
Cottontail rabbits will cut the tender sprouts and eat bark from the branches of many trees, shrubs and vines.

During summer months the foliage provides protective cover. The fruits are available during late summer, fall and winter months.

HICKORY

WILD CRABAPPLE

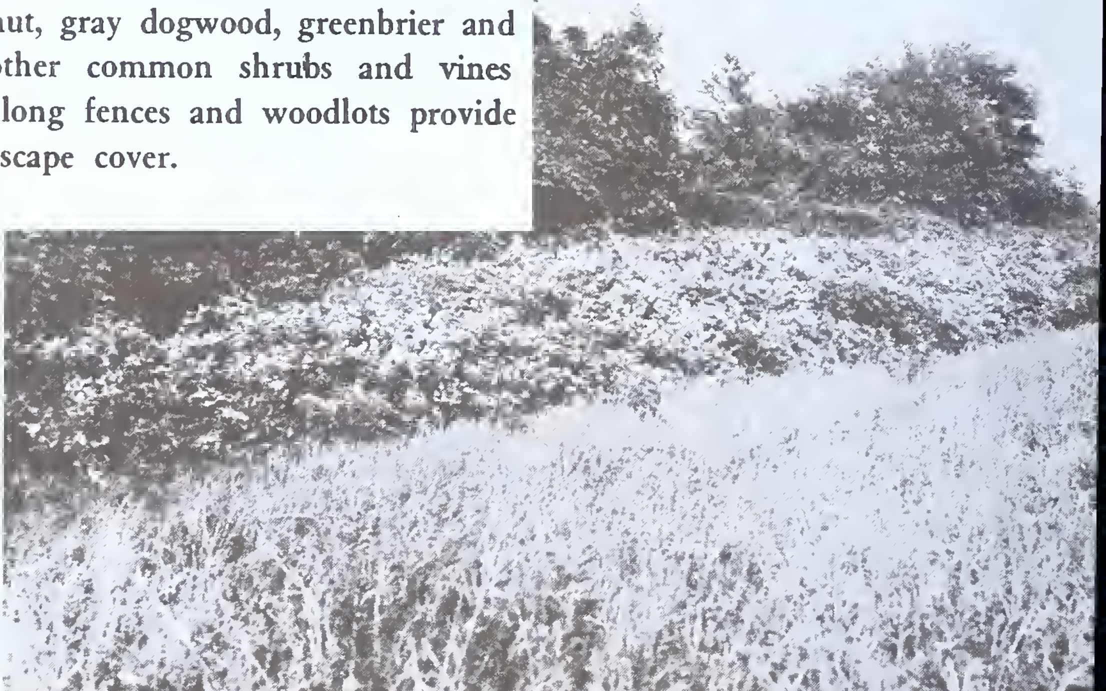
SUMAC



FOX GRAPE

Evergreen tree plantations provide cover for wildlife and a source of income to the farmer.

Reproduction of blackberry, hazelnut, gray dogwood, greenbrier and other common shrubs and vines along fences and woodlots provide escape cover.



PROTECTIVE COVER IMPORTANT FOR WILDLIFE

Evergreen trees in their early growth provide escape cover. Hedges, fences, woodlot borders, gullies, steep slopes and stream banks covered with low woody vegetation and weeds form travel lanes, nesting, brooding and escape cover for all farm wildlife.

Natural reproduction of white pine, hemlock and laurel provide excellent cover in woodlot areas.

Black locust, flowering dogwood, wild crabapple, thornapple, witch hazel, maple, hickory, greenbrier and wild grape are some of the more common trees, shrubs and vines which normally grow in gullies. Farm wildlife is usually present in these thicket areas.

CHAPTER II

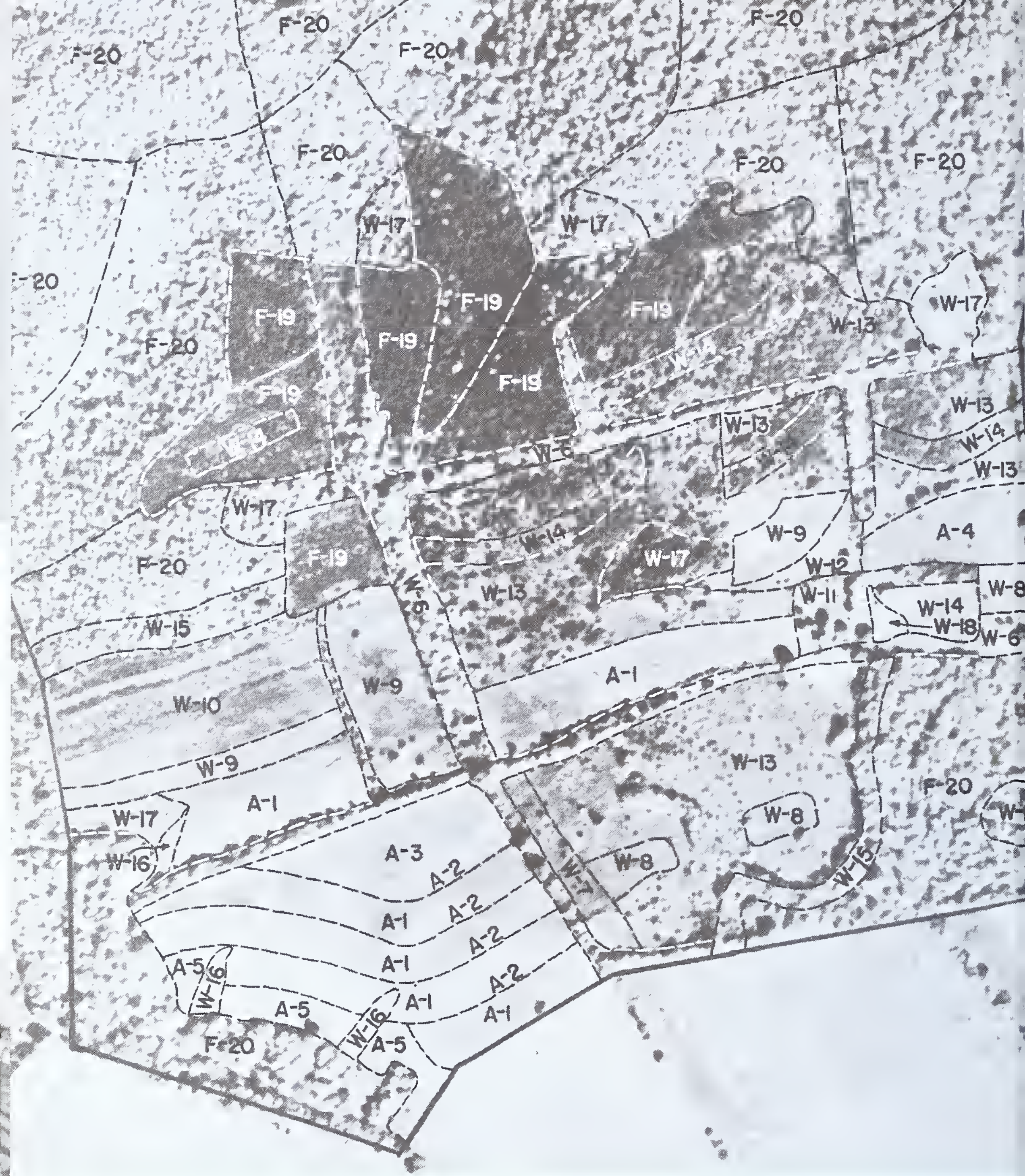
Food and Cover for Wildlife on Marginal and Submarginal Farm Areas

Consideration must be given to food and cover development for wildlife on the poorer agricultural lands, often referred to as marginal or submarginal farms. Naturally the treatment is different from practices approved for the better farms, since the primary objective is not profit from farm crops but to develop the area for wildlife.

Many hunting clubs, after purchasing old farms, have written to the Pennsylvania Game Commission requesting suggestions for improving these lands for wildlife. Therefore, this portion of the issue should be of interest to many sportsmen.

The following pages will present suggested practices that may be applied to marginal or submarginal areas on which soil erosion and reduction of humus has made many of the fields unproductive of farm crops.

Proper management of agriculture, wildlife and woodland areas will increase the value of submarginal farms as hunting and dog training areas. Many of the operations will be self-supporting, but others will require work by the landowner or sportsmen's group interested in this development.



The above picture is an aerial view of a typical marginal or submarginal farm in southern Pennsylvania.

To make this productive for wildlife a definite land-use plan must be followed. Development as recommended on the next sheet indicates various practices which the owners may apply.

Recommended Development Practices

A - AGRICULTURAL AREAS

A-1 Farming Fields
A-2 Planting Field Hedges
A-3 Planting Permanent Sod
A-4 Planting Nut Tree and Fruit Orchards
A-5 Planting Field Edges and Odd Corners

W - WILDLIFE AREAS

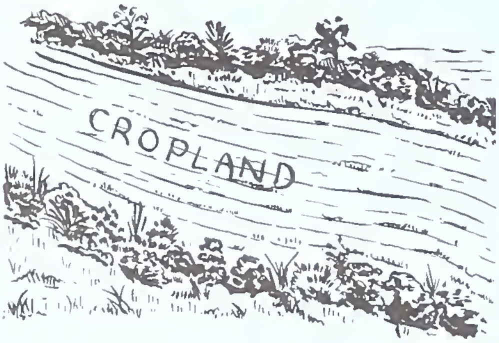
W- 6 Improving Fence Rows
W- 7 Planting Streambanks
W- 8 Planting Waste Areas
W- 9 Planting Permanent Clovers
W-10 Planting Evergreen Trees
W-11 Managing Old Orchards
W-12 Improving Clover Growth on Untilled Fields
W-13 Improving Shrub Growth on Untilled Fields
W-14 Planting Food Strips
W-15 Cutting Woodland Borders
W-16 Planting Gullies
W-17 Releasing Shrubs and Vines—Woodlot Areas
W-18 Developing Water Supply and Ponds

F - FOREST OR WOODLOT AREAS

F-19 Managing Reverted Fields
F-20 Improving Woodlots Through Timber Sales

SUCCEEDING PAGES DESCRIBE EACH DEVELOPMENT PRACTICE INDICATED ABOVE.

Development of Agricultural Areas



A-1 FARMING FIELDS

Locations indicated on the picture by the number A-1 are the better soil sites with little erosion. Local farmers are usually interested in a share-cropping agreement, whereby they farm fields on a crop rotation basis, planting corn with ryegrass cover crop one year, wheat or oats the second year and then seeding clover which should stand two or more years.

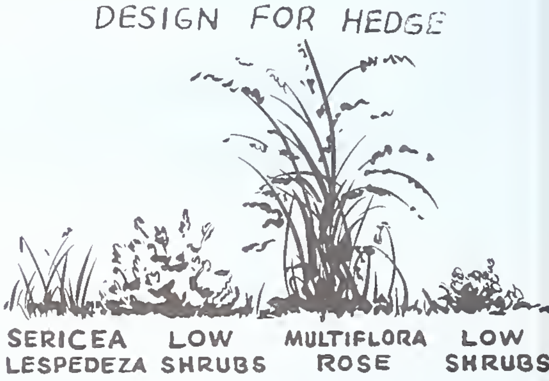
In return for the use of these fields, the landowner may either take a share of the harvested grains, or arrange for the share-crop farmer to plant other food strips each year without charge.

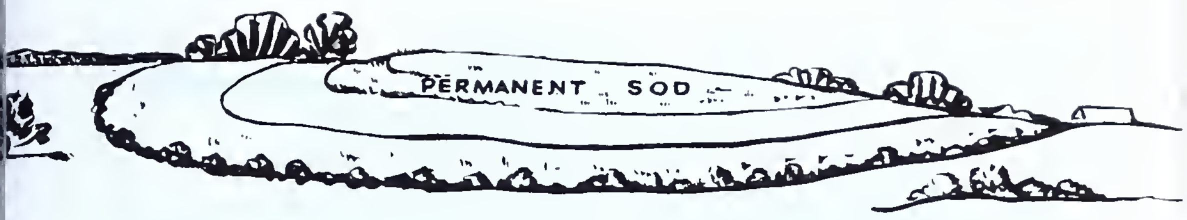
A-2 PLANTING FIELD HEDGES

Establish contour hedges approximately 36 feet wide between crop fields.

Tatarian honeysuckle, arrowwood, Regel privet and multiflora rose are often used for the center rows. Bicolor lespedeza coralberry and hazelnut may be planted next, with the outside strip seeded to sericea lespedeza. Other shrubs may be substituted (see back of issue).

On open field areas these wide hedges provide wildlife with natural food and cover adjacent to cropland.





A-3 PLANTING PERMANENT SOD

Permanent grass-clover areas should be maintained above steep fields. To establish, plant small grains with adjoining crop land, then seed permanent type grass-clover mixture the following spring. Mow areas late each summer to stimulate succulent growth (farmers will usually handle this mowing with their share crop activities).

These areas are utilized by nesting birds and rabbits. The importance of open sites, which produce greens and insect life for young birds to feed upon, cannot be too highly stressed.

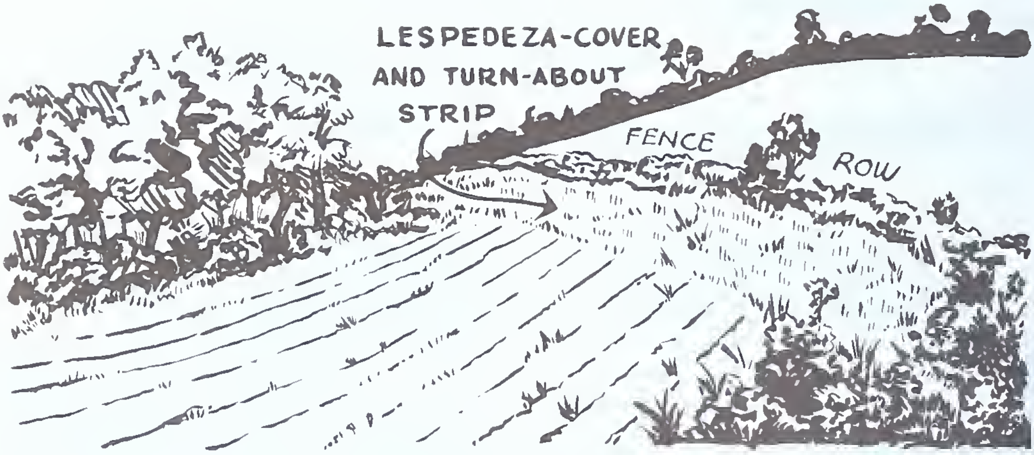
A-4 PLANTING NUT TREE AND FRUIT ORCHARDS

Trees and shrubs, including walnut, hickory, Asiatic chestnut and filbert, may be planted as orchard crops. The nut yield may either be left for wildlife or sold to pay development costs. Nurserymen will furnish specific planting instructions.

Areas between rows should be cultivated and seeded to clovers. Mow annually, mulch trees with hay and weeds. Prune to provide shape and room underneath for cultivating and harvesting.

Apple trees also provide an important wildlife food. Fallen fruits and pruned branches are eaten by rabbits during fall and winter months.

ORCHARD TREES

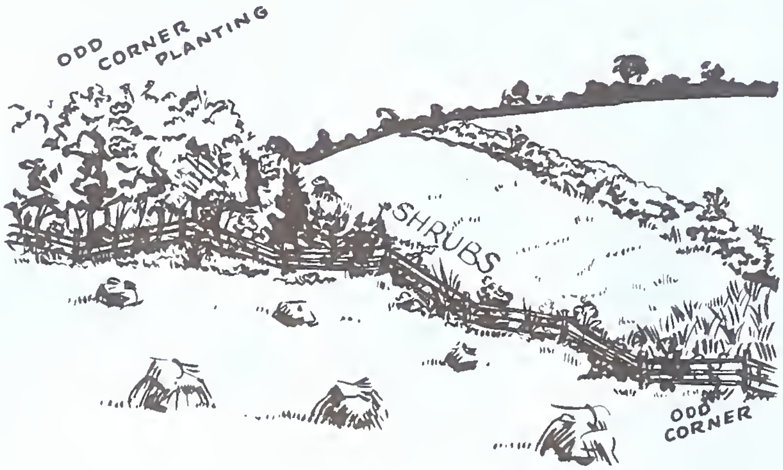


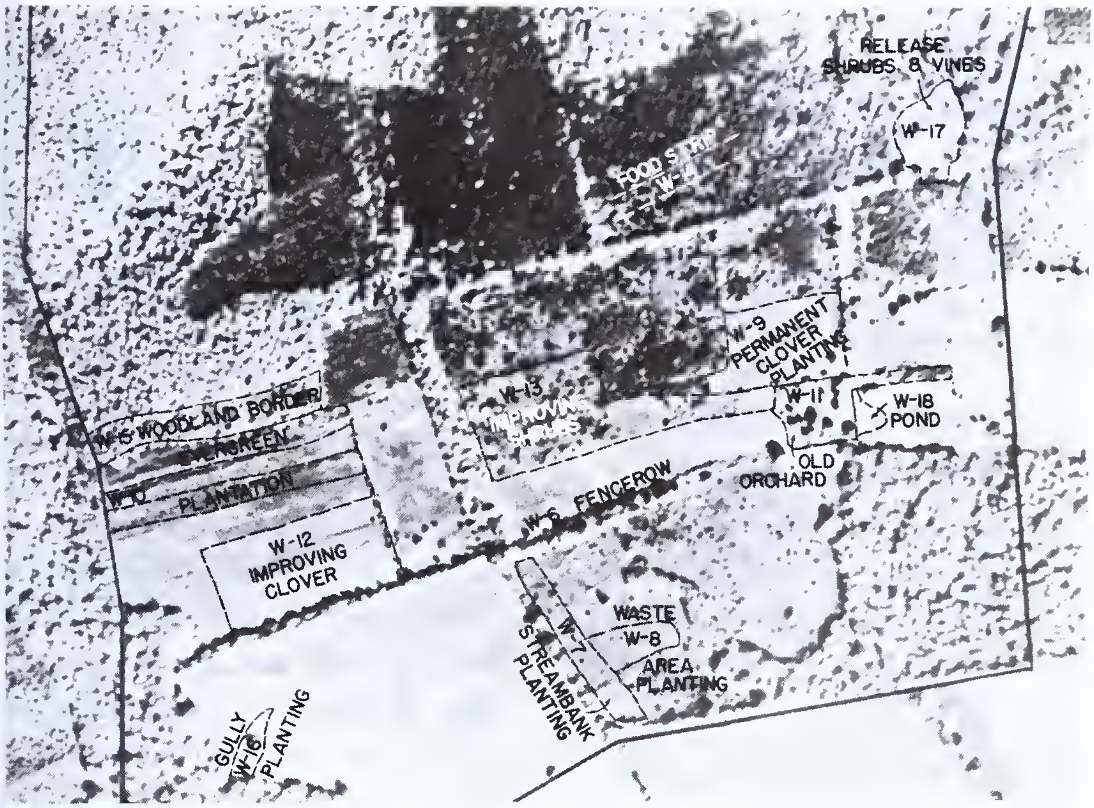
A-5 PLANTING FIELD EDGES AND ODD CORNERS

Field edges adjacent to fence rows or woodland borders are improved for wildlife by having the farmer seed a 30′ food strip to sericea lespedeza or a grass-clover mixture. He can turn his equipment on these field ends. (See Planting Instructions—back of this issue.)

When fields are contoured odd corners of ground are left at various locations. These may either be seeded to sericea lespedeza, a permanent grass-clover mixture or planted to any one or combination of the shrubs mentioned for hedge row plantings.

It is wise to retain a portion of the odd field areas in grasses and clovers in order to provide nesting sites for wildlife. Often natural reproduction of shrubs and vines will improve the food and cover on these sites.



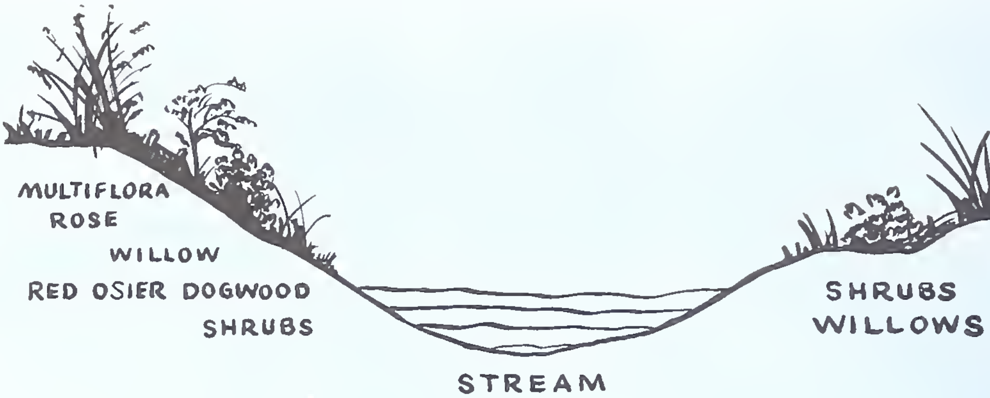


Development of Wildlife Areas

W-6 IMPROVING FENCE ROWS

Old fence rows usually contain a mixture of shrubs which are shaded by large maple, aspen, ash, locust and oak trees. By felling the larger trees, the mature shrubs and vines such as gray dogwood, blackberry, raspberry, choke cherry, silky dogwood, sassafras, flowering dogwood, grape and greenbriar will receive sunlight and increase their fruit yield. Limbs and tops arranged in large piles provide excellent rabbit cover.

Several rows of low growing shrubs may be planted on either side of mature fence row cover to increase width and type of wildlife food and cover.



W-7 PLANTING STREAMBANKS

Streambanks are natural locations for wildlife to utilize. Many are badly eroded and will be improved by planting with shrubs native to wet soils.

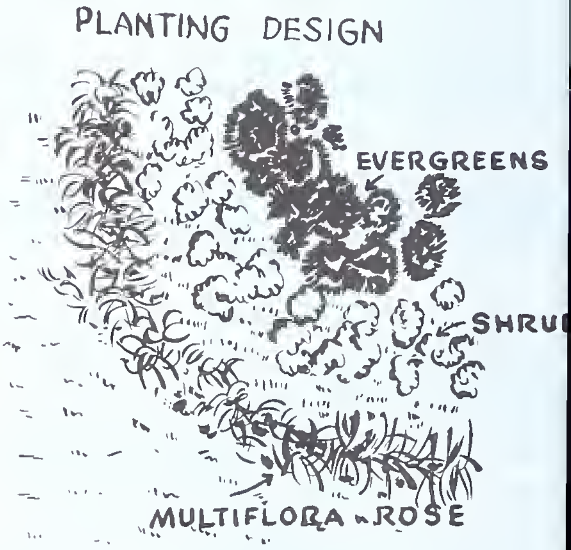
When correcting the eroded areas, first slope the banks. Then plant with basket willow, elderberry, red osier dogwood, and silky dogwood spaced 3 x 3 feet. Mulch bank with branches held in place with willow stakes and wire. A row of multiflora rose, spaced 3 feet apart, planted along the top of the bank will give added protection and increase food and cover for wildlife.

W-8 PLANTING WASTE AREAS

Sink holes, old building foundations, rock piles in fields, and rock outcrops are found on many farms.

These locations provide retreat areas and produce excellent food for wildlife when trees, shrubs and vines become established.

On large areas 30 or more evergreen trees such as Norway spruce, red pine and Scotch pine may be planted in the center, spacing them 8 feet apart, to provide year around cover. Thornapple, multiflora rose, arrowwood, silky dogwood, gray dogwood and hazelnut are seedlings suggested for planting around the evergreens, spacing them 4 feet apart for best results.



W-9 PLANTING PERMANENT CLOVERS

Many hillside areas are eroded and cannot be reclaimed for agriculture. At these locations the variety of wildlife food and cover will be improved by seeding the steepest slopes to sericea lespedeza, Korean lespedeza or crown vetch. Patches from one-half to two acres in size are not too large.

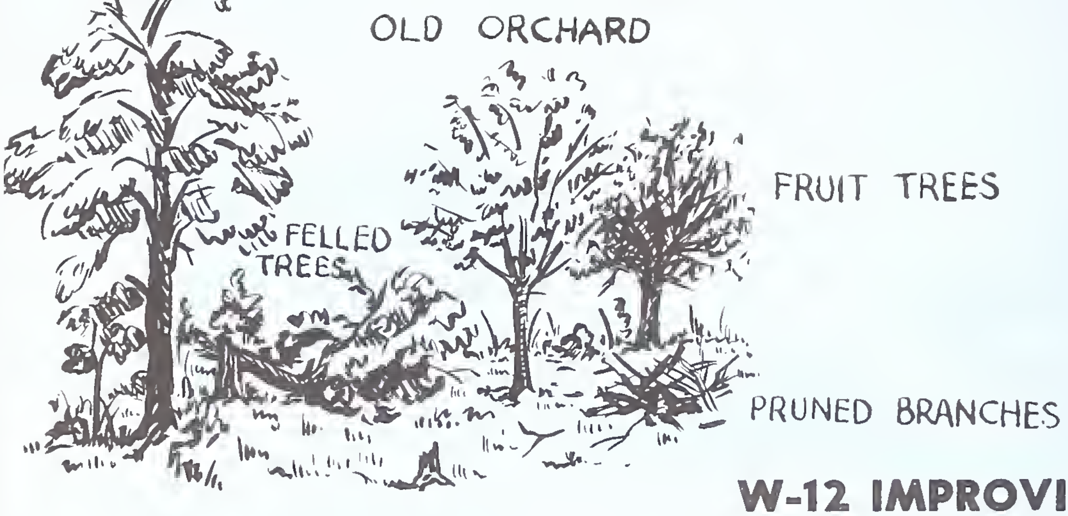
Lespedeza and crown vetch seed is difficult to purchase, but local seedmen may be able to obtain it from larger supply houses.

W-10 PLANTING EVERGREEN TREES

Landowners and organized clubs should plant evergreen seedlings to provide protective cover strips on untilled fields.

By planting a thousand or more seedlings, spaced 5 to 6 feet apart, each year, trees of different sizes will soon be growing in the fields, assuring the best cover for wildlife and a continuous harvest if the owner wishes to sell them annually for Christmas trees.

Austrian pine, red pine, Scotch pine, white pine and Norway spruce are sold in various sizes over 3 feet tall for Christmas trees. Seedlings for this purpose must be purchased from commercial nurserymen. Proceeds from the sale of trees will help finance other development work, while the standing evergreens continue to provide cover for farm wildlife.



W-11 MANAGING OLD ORCHARDS

Old orchards usually provide a variety of food and cover attractive to all farm wildlife.

Release apple trees from overshadowing tree growth by felling maple, ash, locust, aspen and other timber which has become established in neglected orchards. Pile the tops for cover. Prune all fruit trees during winter months, piling the branches to provide food and cover for rabbits. Fallen fruits, particularly apples, furnish food for practically all forms of wildlife.

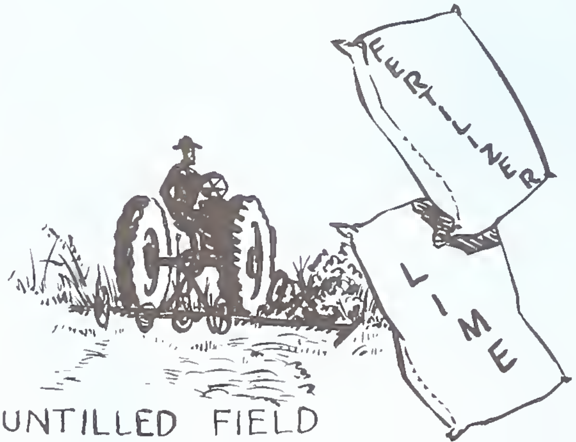
The importance of managing orchards cannot be over-emphasized.

W-12 IMPROVING CLOVER GROWTH ON UNTILLED FIELDS

Many untilled field areas on submarginal or marginal lands should be retained as open areas. These fields provide nesting sites and a variety of succulent foods and insects required by farm wildlife.

Mow selected fields in mid-summer each year—or, if costs are prohibitive, do the job once every three years to retain it in sod.

Succulent growth can be improved by broadcasting approximately 300 lbs. of complete fertilizer and 2000 lbs. of lime per acre. Disc following application. Seed lightly (1 to 2 lb. per acre) with white Dutch and Ladino clover seed to improve the quantity and quality of wildlife food and cover.



W-13 IMPROVING SHRUB GROWTH ON UNTILLED FIELDS

Many reverting fields are grown to scattered trees, shrubs and weeds.

To prevent the field from becoming a forest, and to improve the production of fruits and berries by shrubs, requires removal of the large seed trees. The landowner should fell all trees such as maple, ash, locust, and elm, piling the brush in very large piles for rabbit cover.

Hazelnut, thornapple, wild crabapple, wild plum, arrowwood, gray dogwood, flowering dogwood, huckleberry and blackberry are some of the more valuable shrubs that will benefit by this operation. When sufficient sunlight reaches the plants, they will produce increased food and cover for wildlife.

W-14 PLANTING FOOD STRIPS

Marginal or submarginal farms include fields not suited to rotation farming. Many are grown to scrub pine, elm, maple, ash and other tree species, and are located some distance from cropland.

In order to increase the wildlife population it is essential to establish scattered food strips containing grains and clovers.

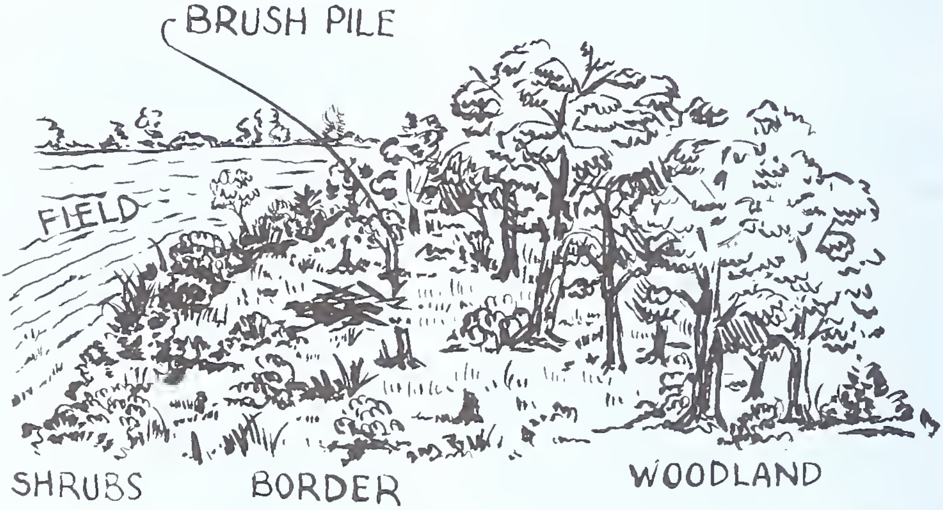
The suggested practice is to clear strips varying from 60 to 100 feet wide. Locate on the contour. Pile tops and stumps on the lower half of the clearing, then plant grains on the upper half of the strip and seed to clovers and grasses. Most of these areas have poor acid soils and will

benefit by the application of fertilizer and lime.

Planting recommendations in the back of this issue may be followed. However, if the soil is fertile and enough lime has been applied, seed to Ladino clover (2 lbs. per acre) or a Ladino-Alsike clover mixture of 3 lbs. per acre.

Mow clovers at least once each year, preferably in July, to increase succulent growth.

Fell any trees shading the food strips, and pile tops for cover.

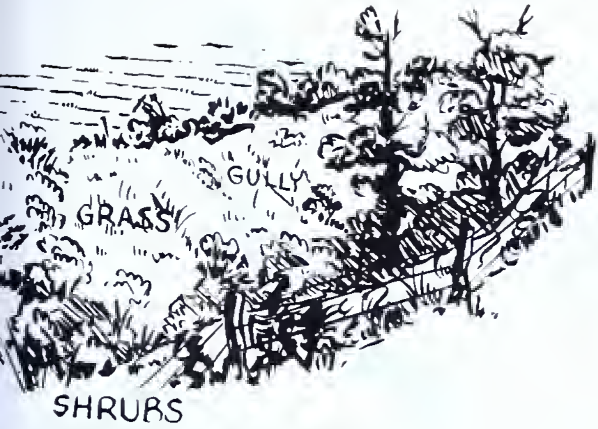


W-15 CUTTING WOODLAND BORDERS

Edges of woodlots contain natural growth of many shrubs and vines which produce berries and nuts. When trees become large and shade the border, they reduce the fruiting of this woody vegetation.

On these woodland borders landowners should remove all trees for a width of 30 feet along the edge. Local timbermen will often cut the trees and pay for wood products removed, thus financing the improvement. Save all shrubs anc vines. Pile tops on the strips fo rabbit cover.

Flowering dogwood, blackberry thornapple, silky dogwood, arrowwood, gray dogwood, greenbrie and fox grapes, are some of th shrubs and vines that will thrive o the border, providing excellent foo and cover for wildlife.



W-16 PLANTING GULLIES

Gullies are ditches or miniature valleys formed by water erosion and may be found on practically all farms.

If they are shallow, disc and seed to perennial grasses and clovers. Then plant shrubs spaced 3 feet apart. Tatarian honeysuckle, silky dogwood, blackhaw, and gray dogwood are shrubs that may be used, with Multiflora rose as the outside row.

In very deep gullies the bottom may be planted to basket willow, elderberry, etc., the lower slopes to banks pine and black locust and the upper slopes to shrubs listed in the preceding paragraph.

By planting these areas, erosion is reduced. The resulting plant growth produces food and cover for wildlife.

W-17 RELEASING SHRUBS AND VINES—WOODLOT AREAS

Shrubs and vines produce more fruits and a heavier foliage when growing in the open where sunlight reaches the plants.

A wildlife development practice recommended for woodlot areas is to fell large trees which shade clumps of flowering dogwood, thornapple, wild grape, greenbriers, etc.

Where vines are present, fell trees on large piles to provide natural arbors. Drop trees with vines on top of pile.

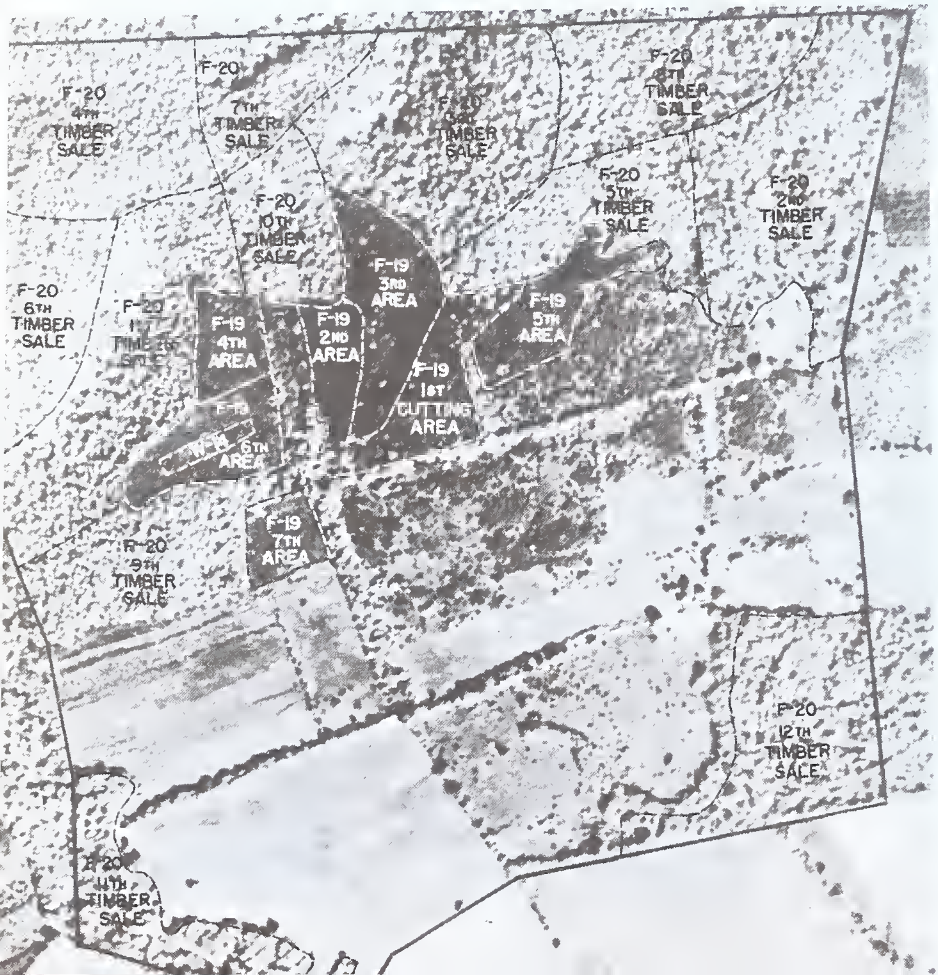
Clumps of shrubs are best released from competitive growth by felling trees away from the shrubs or cutting and piling the tops.

W-18 DEVELOPING WATER SUPPLY AND PONDS

It is often desirable to build small ponds near farm buildings or clubhouses to improve fire protection and provide fishing. Plantings of red osier dogwood, basket willow and other wet area shrubs at the upper end of the pond increases food and cover for wildlife.

Where ponds are large enough, waterfowl foods such as smartweed, wild duck millet, etc., may be planted. (See back of issue for list of materials).

DEVELOPMENT OF WOODLOT AREAS



F-19 MANAGING REVERTED FIELDS

Forests which have developed on old fields, through natural seeding, quite often are solid stands of scrub pine.

On these areas, narrow strips or small blocks of trees should be sold for paperwood, spacing the cuttings several years apart.

Shrubs and vines, including flowering dogwood, thornapple, wild crabapple and wild grape will thrive on the timbered areas. Tree tops furnish brush piles.

By cutting these narrow strips, the surrounding trees will seed in the opening, thus providing new pine growth which produces wildlife cover and timber for the future.

F-20 IMPROVING WOODLOTS THROUGH TIMBER SALES

Periodic sales of select timber in a farm woodlot will greatly improve the forest.

The owner should control timber operations, either by selling specific trees which he has marked, or limit the cut to definite species and minimum diameters. Advice from local foresters will help protect your investment.

Larger timber (usually over 12 inches in diameter) may be sold for sawlogs, while the smaller trees and tops may be marketed as paperwood, mine props, posts, etc. Profits help finance other wildlife practices.

Removal of large trees stimulates sprout growth and reproduction of trees, shrubs and vines, thus improving food and cover for wildlife.

Please note that cutting blocks are indicating on the plan. By selling several acres every five years, continuous food and cover will result. Harvesting of all trees on smal scattered plots of approximately on acre provides slashings or cove strips, which will be utilized b wildlife for nesting and escape cove

Since squirrels, raccoons and many cavity nesting birds require hollow trees for their homes, provisions should be made to retain at least two den trees per acre.

Planting and Miscellaneous Information

FOOD STRIPS FOR WILDLIFE

For those farmers, sportsmen and naturalists wishing to establish food strips, the following plantings are recommended for various species of wildlife. Planted according to directions, the supplemental food and cover produced by the plots will greatly improve wildlife habitat.

MIXTURE TO PLANT FOR QUAIL AND SONGBIRDS

	lbs.
Broom corn millet, Japanese millet or German millet	3.5
Broom corn or Midland grain sorghum	2.5
Amber sorghum	2.5
Sunflower	1.5
Mixture to seed 1 acre	10.0

In the seed mixture either one of the millets or a mixture of the three may be used, depending on which varieties can be purchased. The same pertains to the possible use of broom corn or midland grain sorghum.

Planting instructions: Plow in May, apply 400 lbs. of complete commercial fertilizer and 1 to 2 tons of lime per acre as needed, harrow, broadcast seed mixture at the rate of 10 lbs. per acre, and cover by light harrowing.

This mixture is primarily intended for small birds but the resulting food and cover will be utilized by all farm wildlife.

Plantings for Rabbit Food and Nesting Cover

OATS SEEDED WITH ONE OF THE FOLLOWING MIXTURES

MIXTURE NO. 1

	lbs.
Orchard Grass	2
Redtop	2
Red Clover	2
Timothy	4
Alsike Clover	1
Total	11

MIXTURE NO. 2

	lbs.
Sweet Clover (yellow or white top)	1
Timothy	4
Alsike Clover	2
Orchard Grass	2
Redtop	2
Red Clover	2
Total	13

Each Mixture will seed one acre.

Planting instructions: Plow April 15 to May 15, apply 2 tons of lime if needed, harrow and seed 1 bushel of oats per acre and one of the mixtures, using 300 to 400 pounds of complete analysis commercial fertilizer per acre.

Note: If it is necessary to plow in the late summer or fall, winter wheat may be planted, then seeded the following spring to the proper grass-clover mixture or to clover.

The oats and wheat should be left standing in the field thus providing excellent food for all wildlife. The seeding of clovers and grass will not only furnish food but also nesting cover.

It is recommended that a strip at least 12 feet wide be mowed along the edges of these clover-grass strips each year. Mow after the nesting season is over to produce succulent green growth.

PLANTINGS FOR RINGNECKED PHEASANTS

Since standing field corn, soybeans, and buckwheat provide food and cover most desired by ringnecked pheasants, the following recommendations for planting are made:

1. FIELD CORN AND SOYBEANS IN ROWS.

Planting instructions: Plow in May, spread 1 to 2 tons of lime per acre if needed, harrow, plant 6 to 8 lbs. of field corn seed and 1 peck of soybean seed in the following spacings, utilizing the pea and bean attachments of the corn planters. Apply 300 to 400 lbs. of complete commercial fertilizer per acre in rows with the corn.

(a) Two (2) grains of corn and 1 to 2 soybean seeds per hill spaced 36 inches apart in the rows; or

(b) One (1) grain of corn to every 12 or 16 inches of row and 1 soybean seed every 6 to 8 inches of row.

Cultivate the field at least twice.

2. FIELD CORN IN ROWS, WITH SOYBEANS OR BUCKWHEAT BROADCAST BEFORE THE LAST CULTIVATION. (Use of Buckwheat in norther tier counties and soybeans in the southern half of Pennsylvania is recommended).

Planting instructions: Plow in May, spread 1 to 2 tons of lime per acre if needed, harrow, plant 6 to 8 lbs. of field corn seed per acre in rows, using 300 to 400 lbs. of complete commercial fertilizer. Space the corn one seed every 12 to 16 inches in the rows, which should be 42 inches apart.

Cultivate at least twice. Just before the last cultivation, broadcast 1 bushel of soybean or buckwheat seed (this should be done before the corn is 20 inches high). The last cultivation will cover the seeds.

OTHER FOOD STRIPS

All wildlife, including deer, wild turkeys and grouse utilize food strips planted on submarginal fields near heavily wooded ridges. A fall or winter grain seeded to clovers and grasses is particularly beneficial at these locations.

WINTER WHEAT SEEDED TO CLOVER

Planting instructions: Plow during August or early September, apply two tons of lime per acre if needed. harrow, drill in 10 to 12 pecks of winter wheat seed during September and 300 pounds of complete commercial fertilizer per acre. (Heavier wheat planting for deer pasture)

No. 1
For Northern Half of Penna.

	lbs.
Birdsfoot Trefoil	4
Alfalfa	3
Alsike Clover	1
Ladino Clover	1
White Dutch Clover	1
Total	10

No. 2
For Southern Half of Penna.

	lbs.
Alfalfa	4
Red Clover	2
Ladino Clover	2
White Dutch Clover	2
Total	10

Each mixture will seed one acre, and should be seeded on the wheat early the following spring.

Plots seeded in this manner provide green growth which is eaten by wildlife in late fall and early spring, grain for summer consumption and clover growth the following seasons. In addition these open fields should increase the insect life, which is an important summer food for wild birds.

Pure stands of clover may be seeded instead of the suggested mixture. Ladino clover provides excellent food for wildlife. It may be seeded alone at the rate of 2 to 3 pounds per acre. For other mixtures consult your local seedman or county agriculture agent.

Hairy vetch planted in the fall at the rate of 30 pounds per acre with one bushel of rye seed provides food that will attract cottontail rabbits from a considerable distance.

PLANTING SERICEA LESPEDEZA

Sericea Lespedeza is a deep rooted, bushy perennial standing 2 to 4 feet in height with greenish yellow flowers. It is a native of Asia and was first grown in this country in the year 1896. It is well adapted in southeastern Pennsylvania.

Although seed does not mature in northern Pennsylvania, it produces excellent cover.

Unscarified seed should be planted a month earlier than scarified seed, preferably before May 15th, at the rate of 15 to 20 pounds per acre. All Sericea Lespedeza should be inoculated. Sow with a nurse crop such as oats, planted at the rate of 4 pecks per acre on a prepared seed bed, and fertilize with 300 to 400 pounds of complete analysis fertilizer. It has done well in southern Pennsylvania when seeded in the spring on fields of winter wheat.

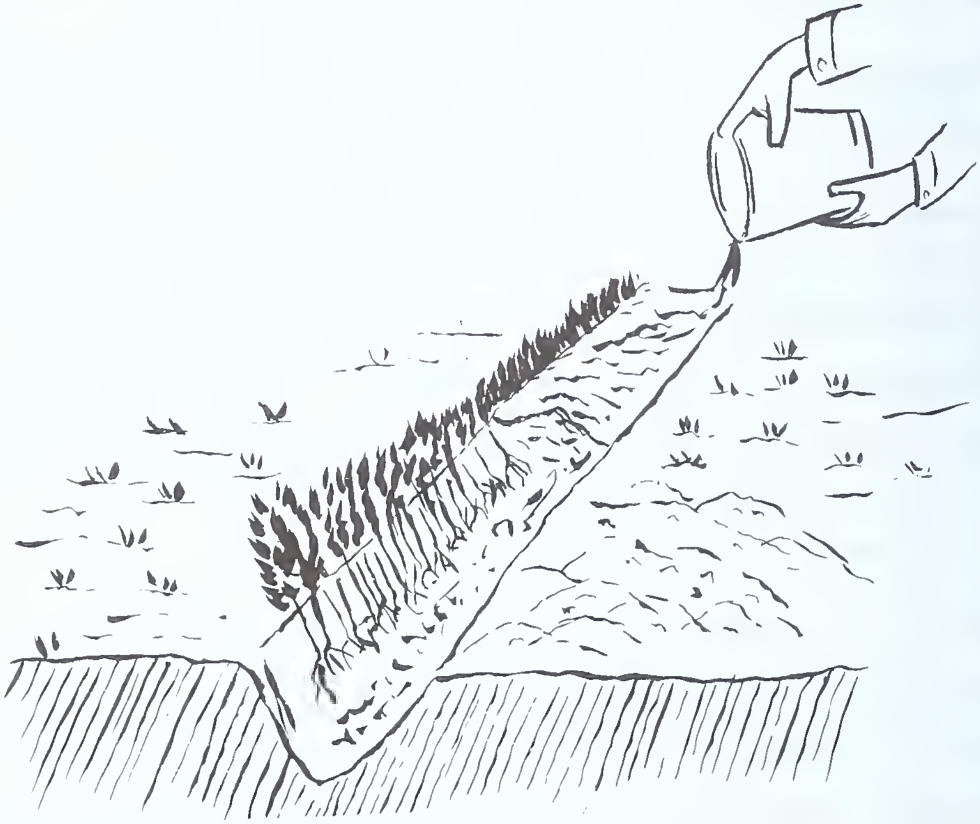
If the site is severely eroded a light pine cover, grain straw, or other mulch, is recommended for temporary protection. Sometimes three (3) years are required for a good stand. It survives where drought even kills alfalfa and Korean Lespedeza. It is not recommended for a hay crop in Pennsylvania. It prefers well drained clay loams or heavy silt loams. Lime helps but is not essential. Its ability to withstand shade in the dead strip, or eroded unproductive field border between cultivated fields and woodland, makes it very useful.

Sericea Lespedeza contains good nesting cover when young and the seed is available to wildlife in the winter. The plant is eaten by rabbits and the quail and songbirds eat the seeds.

Growth of the stand the first year is 4″ to 14″, the second year 20″ to 48″, with seed in profusion.

PLANTING SEEDLINGS

Tree, shrub and vine seedlings are received from the nurseries in bundles with the roots wrapped in moist moss or other protective cover. When the shipment arrives, break the string that holds each bundle and heel-in all plants as outlined below, completing the field planting as soon as possible.



a. Dig a sloping trench.

b. Place thin layer of trees against sloping side (approximately 100 trees per linear foot of trench).

c. Cover roots with moist soil and pack soil firmly.

d. Keep soil moist.

When ready to plant seedlings, lift enough from the heel-in bed to partially fill a 10 or 12 quart water pail or bucket. Place a few inches of water in the bucket, add a handful of soil and mix thoroughly. Roots should be covered with this thin mud for protection. Never expose roots to the sun until ready to plant.

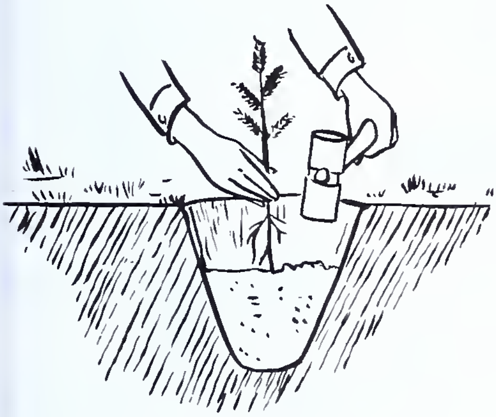
Planting is usually done by two men. One man digs the holes with a sharp maddock, piling the soil on a pile at the edge of the hole. It is his job to properly space the holes for the type of planting desired.

The second man or planter follows with his bucket of planting stock. He plants one seedling in each hole as deep as it was in the nursery, spreads out the roots, and presses loose soil over and around them, packing it firmly with mallet, stone or hand. Do not pack grass, leaves or sod against roots. The balance of soil is then pushed into the hole and firmly packed with the heel of the planters shoe. Tree should stand upright and be firmly set.

PLANTING PROCEDURE

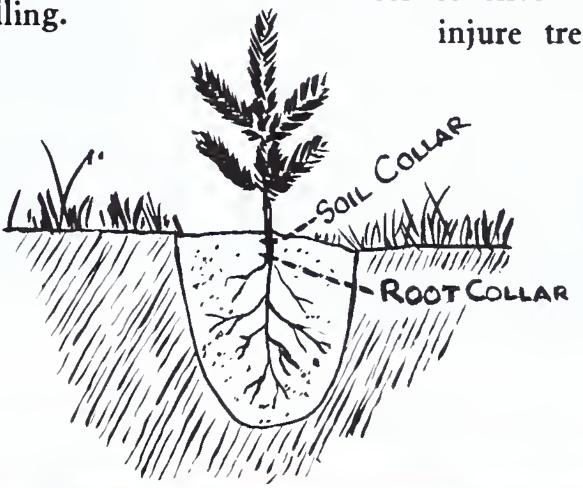
1. Dig Hole.

2. Hold tree in place and partly cover roots with soil.



3. Pack soil with mallet, stone or hand before final filling.

4. Fill hole with soil and press firmly with heel of shoe. Do not injure tree.



5. Tree properly planted.

Tree, Shrubs and Vines for Wildlife Areas

The following trees, shrubs, and vines produce food and cover utilized by wildlife, and are recommended for open woodlot and field planting

EVERGREEN TREES

RED PINE
WHITE PINE
SCOTCH PINE
HEMLOCK
AUSTRIAN PINE
BANKS PINE
NORWAY SPRUCE
WHITE SPRUCE

OTHER TREES

WHITE OAK
RED OAK
BLACK WALNUT
SHELLBARK HICKORY
BLACK LOCUST
APPLE
CUCUMBER
MOUNTAIN ASH
PERSIMMON
TULIP POPLAR
MULBERRY
CHESTNUT (ASIATIC)

Note: Only the most common and valuable species are listed. When not grown by nurserymen, the landowner may obtain young plants by transplanting from nearby thickets.

SHRUBS

The most important shrub species recommended for conservation plantings in Pennsylvania, and brief information relative to their maximum heights and preferred planting sites are as follows:

Species	Maximum Heights	Preferred Planting Sites
Multiflora Rose (Thorny type)	6-10′	Dry to well drained soils
Tatarian Honeysuckle	6-12′	Dry to well drained soils
Bicolor Lespedeza	9-12′	Dry to well drained soils
Autumn Olive	8-14′	Dry to well drained soils
Blackhaw (Viburnum)	15-20′	Dry to well drained soils
Filberts (Hazelnut Hybrid)	9-12′	Dry to well drained soils
Hazelnut (American)	6-9′	Dry to well drained soils
Gray Dogwood	4-8′	Dry to well drained soils
Bayberry	5-7′	Dry to well drained soils
Coralberry	4-6′	Dry to well drained soils
Privet (Regel or Amur)	10-15′	Only well drained soils
Silky Dogwood	8-12′	Well drained to moist soils
Arrowwood	10-12′	Well drained to moist soils
Highbush Cranberry	6-10′	Well drained to moist soils
Basket Willow	10-18′	Wet soils
Red Osier Dogwood	6-8′	Wet soils

On the better agricultural farms, Multiflora Rose should be planted only where regular farming practices will limit the possibility of its spreading to adjoining fields. It does not grow well in shade or on wet soils.

Other species adapted to special conditions, but difficult to establish or of less value in conservation plantings, are elderberry (American elder), flowering dogwood, sumac, blackberry, red chokeberry, black chokeberry, witch hazel, thornapple (Hawthorne) and choke cherry. These occur naturally on many farms and should be favored in border cuttings, etc. They may be successfully transplanted from one area on the farm to a wildlife planting if extreme care is used in lifting and transporting the stock.

VINES

Although few vines are available in local nurseries, the following produce food and cover for wildlife and should be included in conservation plantings on the farm.

Species	Preferred Planting Sites
Fox Grape	Dry to well drained soils in full sun to full shade.
American Bittersweet	Dry to well drained soils in full sun to half shade.

SOURCE OF PLANTING STOCK

The Pennsylvania Department of Forests and Waters, Harrisburg, Pa., grows and sells millions of seedlings and transplants annually for reforestation and wildlife within the Commonwealth.

Seedlings may be purchased at $6.00, and transplants at $15.00 per thousand plants, plus the express charges. The list of available species of planting stock and details regarding purchase may be obtained by writing direct to the Harrisburg address, or by contacting the nearest District Forester.

Note: Evergreen tree seedlings purchased from the Department of Forests and Waters cannot be marketed for Christmas trees but must be allowed to grow and reforest the area.

Local nurserymen who do not grow trees, shrubs and vines indicated on these pages, can usually refer the interested landowner to larger nurseries that will supply their requirements.

MARSH AND AQUATIC PLANTS

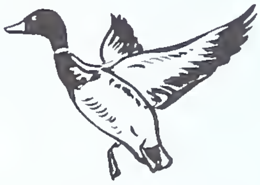
The following is a partial list, showing the more important marsh and aquatic plants that may be seeded or planted to improve food and cover for wild ducks, geese, and other wildlife that may be found around ponds, and marshes on the farm.

AQUATIC PLANTS	PLANTING INFORMATION
WAPATO (DUCK POTATO)	1200 tubers per acre in Marshy areas and mud flats.
WAMPEE (DUCK CORN)	Seed 10 lbs. per acre on swampy land or in acid water 6″-8″ deep. Use only where wood ducks are principal species.
WILD DUCK MILLET	Seed 20 lbs. per acre on moist soils and mud flats.
NODDING SMARTWEED and DOTTED SMARTWEED	Seed 40 lbs. per acre on exposed mud flats.
SAGO PONDWEED	Plant tubers or seed 30 lbs. per acre in 1-6′ of water. Hard fresh water or slightly brackish.
WILD CELERY	Plant 1200 tubers per acre on sandy or mud soils—Alkaline water 1½ to 5 feet deep.
WILD RICE	Seed 60 lbs. per acre in a few inches to 2 feet of water.

MARSH & AQUATIC PLANTS	PLANTING INFORMATION
GIANT BURREED	Seed 10 lbs. per acre in muddy spots and water less than one foot deep.
WATER SHIELD	700 plants per acre in 1-6′ of water.
THREE SQUARE BULRUSH	1200 roots per acre in less than 1′ of water.
HARD STEM BULRUSH	1500 plants per acre in less than 2′ of fresh water.
DUCK'S MEAT (SURFACE FLOATING)	5 bushels of plants covers 1 acre of water.

FULL PLANTING INSTRUCTIONS MAY BE OBTAINED AT THE TIME ORDERS ARE PLACED WITH THE SEEDSMAN

Migratory waterfowl are not of major consideration when managing the average farm for wildlife. Other publications will provide more detailed recommendations for developing food and cover on these water areas.



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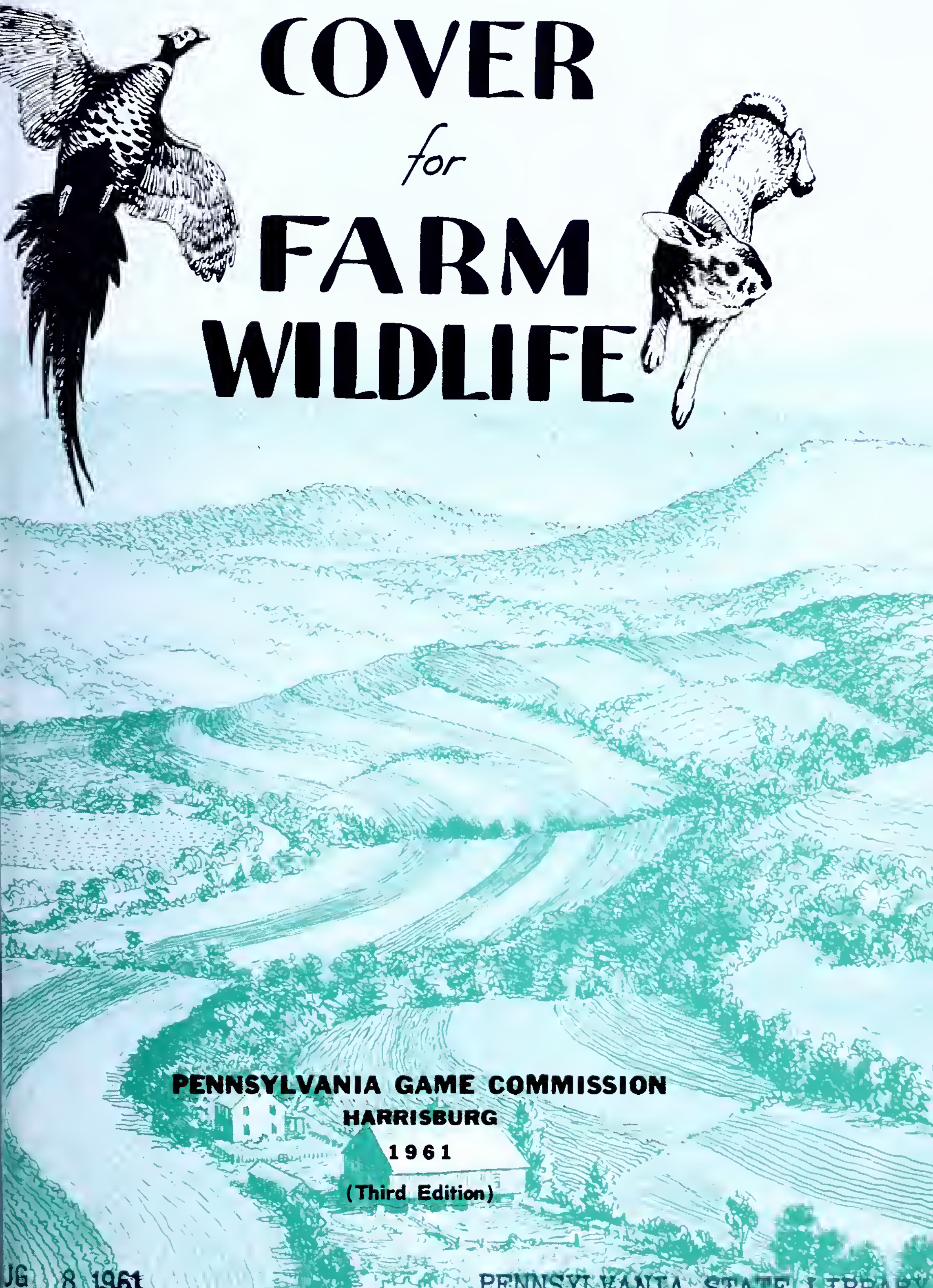
FOOD
and
COVER
for
FARM WILDLIFE



PENNSYLVANIA GAME COMMISSION
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FOOD AND COVER

FOR

FARM WILDLIFE

By

JOHN B. SEDAM

◆

1961

(Third Edition)

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his bulletin, made available for free distribution as a conservation education service, is revised and somewhat condensed edition of Special Issue No. 6, *Pennsylvania Game News* official monthly publication of the Pennsylvania Game Commission) March, 1953. Mr. edam at the time of original publication was Supervisor, Food & Cover Section, Land anagement Division. Since then he has become Chief, Division of Minerals, Pennsylvania ame Commission.

FOOD AND COVER FOR FARM WILDLIFE

Introduction

Interest in outdoor recreation, wildlife preservation and all phases of conservation has increased during the past two decades. This has been the result of stepped-up production in our factories, shorter working hours, better highways and transportation.

Improved firearms and increased hunting pressure have caused increased harvests of game. Changes in agricultural practices, including the introduction of high speed mowing machines and more intensive farming, have combined to reduce the amount of wildlife, and the food and cover which is required to provide it with homes.

Most sportsmen recognize these changing conditions. Some are content to accept a smaller bag of game while others recognize their obligation to future generations, and wish to do something to improve food and cover for our furred and feathered friends. Those that can be of assistance in this worthwhile program need, and are constantly seeking, guidance.

The necessity of wildlife improvement on farm and woodlot areas has long been recognized by the Pennsylvania Game Commission. Since 1930 interest has steadily increased in the application of development practices to provide better homes for game birds and animals, as well as song and insectivorous birds. Nature must be helped. The program was given added importance and financial support when the 1949 Pennsylvania Legislature increased the hunting license fee, and specified that $1.25 from each resident hunting license must be utilized to improve food and cover for wildlife, and to purchase and distribute game to restock hunting areas.

Sportsmen and private individuals can do their share in this common task by improving natural habitat, planting and distributing supplemental food for wildlife. These activities on club grounds, dog training areas and private farms will do much to increase the game supply, and at the same time make those that cooperate realize the need for whole-hearted participation.

Wildlife ON THE FARM

Conservation plans for farms take into consideration the importance of all wildlife, and designate practices that will improve the food and cover for game, song and insectivorous birds.

Game species include Ring-necked pheasants, bobwhite quail, cottontail rabbits and squirrels, which are commonly found on farm and woodlot areas. Today even deer, wild turkey and ruffed grouse, although not considered farm game, are present throughout many farming regions. All these game species, plus raccoons and the common groundhog, provide hunting for farmers and sportsmen alike. Following are pictures of the more important game birds and animals, common furbearers and a few of the song and insectivorous birds found on the farm.

RING-NECKED PHEASANT

These game birds do best where there is intensive agriculture, with marshes and swamps nearby.

They feed upon waste grains, weed seeds, insects (grasshoppers, Japanese beetles, corn borers, etc.), fruits of shrubs and vines and various greens derived from native plants and farm crops such as clover.

BOBWHITE QUAIL

Bobwhite Quail thrive best on marginal farms, with heavy fence row and other good cover thickets. Waste grains, berries from shrubs an vines, insects, succulent green leaves, and an abundance of weed seed provide the food they need.

COTTONTAIL RABBIT

These game animals thrive on most farmland, but require season foods—clovers, grasses, grains and native green plants in the spring an summer; palatable sprout growth, bark of shrubs, and apple limbs, an green forage in fall and winter.

Grassy fields for nesting, standing grain, thickets, brush piles, swan areas and evergreen plantations provide the required cover.

FOX SQUIRREL

Woodlots and forests provide homes for squirrels. The fox squirrel prefers large timber in farm woodlots. Nuts, acorns, fruits and buds from native trees, shrubs and vines, and corn are their most important foods.

RACCOON

Raccoons live in hollow trees, rock dens and holes in woodlot and orest areas.

Their principal foods include fruits of trees, shrubs and vines, birds' ggs, corn and other grains. When foraging along streams they feed upon arrion, frogs, crayfish and mussels.

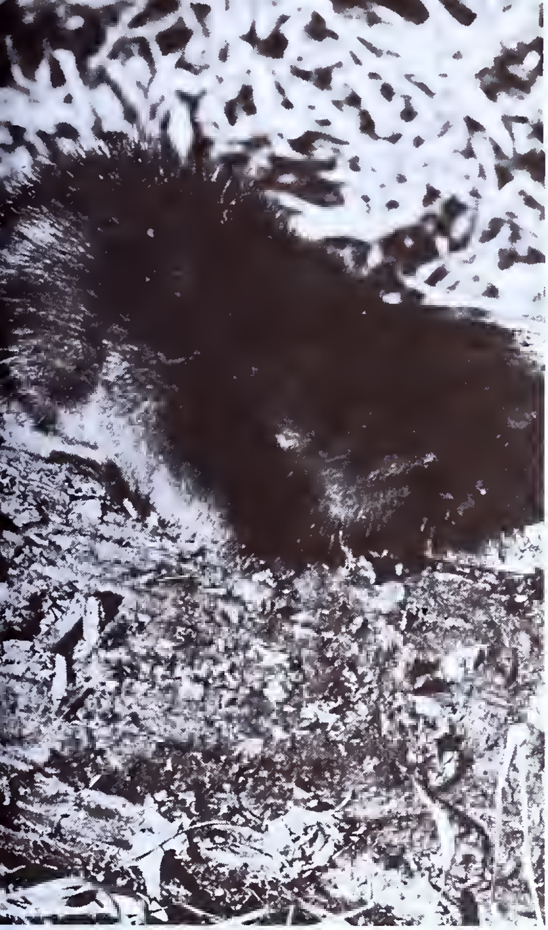
GRAY SQUIRREL

These acrobats of forest and woodlot areas utilize cavities in trees for their homes. They feed largely upon corn from adjoining fields; nuts, fruits, and buds of many trees, shrubs and vines.

WOODCHUCK—(Groundhog)

This common farm game animal, although often proving himself a nuisance by digging holes in fields to provide a home, thrives throughout farming regions.

He feeds upon nutritious clovers and grasses, other green crops, and native plants.



MUSKRAT

These little rodents, native to all inland water areas, are often referred to as "marsh rabbits."

They either build dome-shaped houses in shallow back waters, using cattails and stems of rushes, or burrow under streambanks where the family lives above the waterline.

Muskrats feed upon tubers and leaves of green plants that grow in the water, clovers, grasses, apples and succulent growth near streams. Fresh water clams are included in their diet.

OPOSSUM

These creatures of the woodlot and farm area, noted for their ability to "play dead" when cornered, feed largely upon fruits of native plants and dead animals. They live in hollow trees, rocky dens and holes.

CHAPTER I

Food and Cover for Wildlife on the Better Agricultural Areas

The majority of readers recall past years when good game cover on farms was more plentiful than at the present time. They are aware of the serious water shortages in rural areas, brought about by lowering of the underground water level. Deep gullies in many fields, and even piles of soil washed out on macadam roads, have been observed after heavy rains.

But how many people have considered the reasons for this decline in wildlife cover, reduction of water supply, and even more serious the loss of soil—the basis of all life? They are very simple, namely: improper farming and general misuse of entire watersheds. What can be done to remedy these conditions?

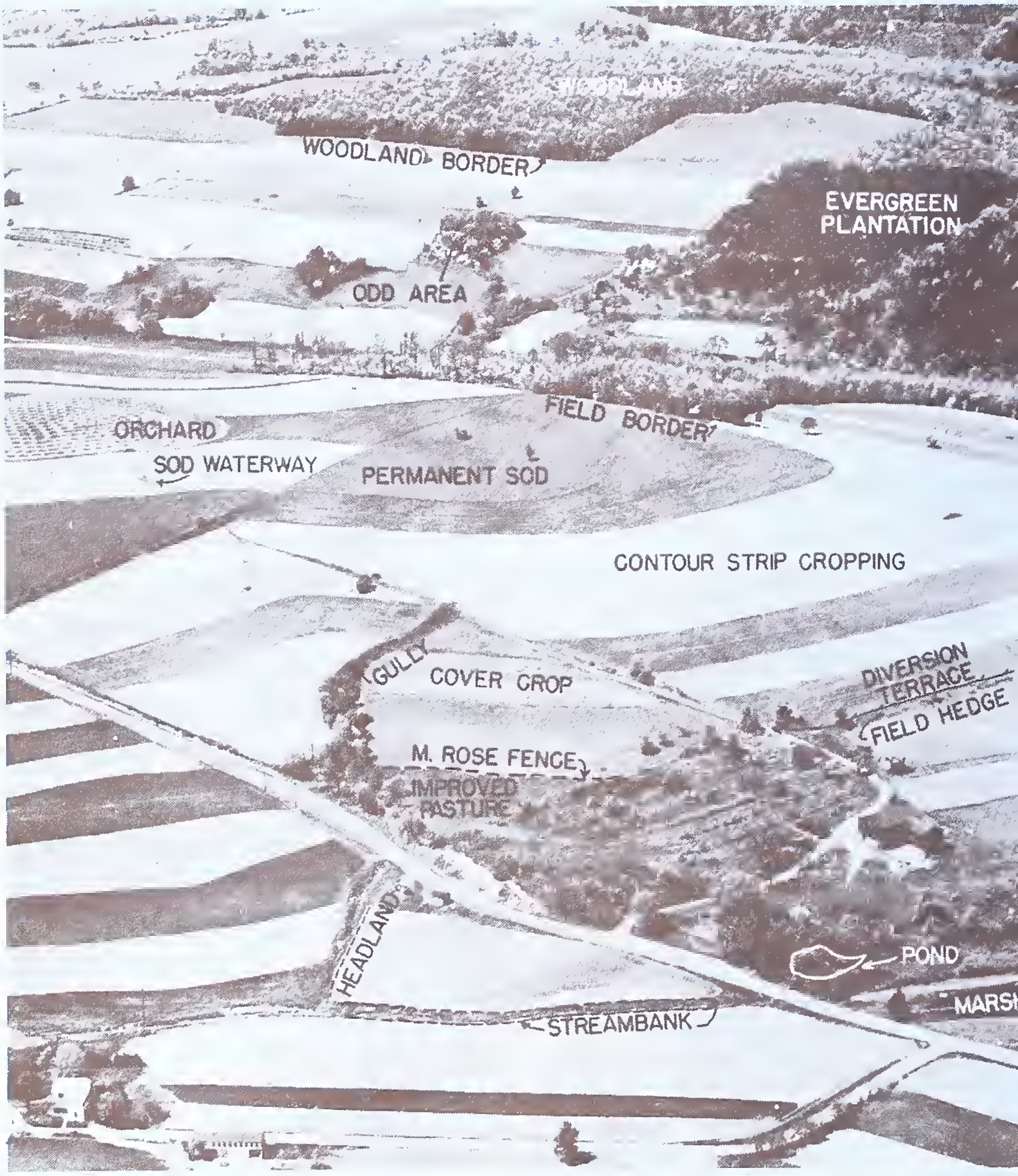
Conservation farming is an attempt to correct these mistakes by contour strip cropping and full rotations on the better field areas; planting trees, shrubs, vines, clovers and grasses to stabilize soil and retain water on very steep slopes and gullies; and managing woodlots protect the watershed. Throu proper land use the humus conte of the soil will increase, the wa level will rise and the land will p duce crops and natural growth th attract, feed and protect farm wi life.

The farmer will enjoy grea income from improved crops, land will be more valuable, a wildlife will be present in ever creasing numbers.

The importance of proper la use cannot be stressed too e phatically. Farmers in every coun of Pennsylvania have recogniz the need for conserving the soil, a have adopted farm practices su as contour strip cropping, prot tion of gullies, streambanks, etc., an effort to improve the land future generations. The accompan ing picture of conservation far ing clearly depicts the application these practices, as they may be a plied to the average farm. Soil c servation districts, organized locally by the farmers in cooperation with the State Soil Conservation Commission, are expanding and providing landowners with land-use plans and services from all cooperating agencies. Advice from county agricultural agents has also stimulated conservation on farms in Pennsylvania. Future Farmers of America, 4-H Clubs and other farm groups are becoming conservation conscious. Even the Boy Scouts of America have a splendid merit badge booklet on conservation.

Following an approved farm plan, the better fields are contoured and stripped to prevent erosion, then rotated to various farm crops. Field hedges are planted on slopes between crop strips and above or below diversion terraces to help reduce water runoff. Gullies are seeded to permanent grasses and planted with game food producing trees, shrubs and vines. Designated slope fields are seeded with permanent grasses and clovers. Odd triangles and rough rocky outcrops are planted to perennial grasses and shrubs. Pastures are improved by applying lime, fertilizer and seasonal mowing. Woodlots are fenced to prevent pasturing and to protect reproduction. Timber is harvested on a selective basis. Streambanks are fenced and planted with shrubs to stabilize soil and reduce erosion. Living fences of multiflora rose are planted between pastures and field strips. Woodland borders are improved by cutting large shading trees along the field edges, thus increasing the acreage of productive land. One can see that most of these land-use and conservation measures, in addition to increasing production of farm crops, will have a direct effect on wildlife by improving food and cover conditions for it.

Conservation Farming



A land-use plan for the typical farm takes into consideration all pra
tices that will conserve the soil, protect the water supply, and, throug
application of correct rotation farming, increase the yield of field crop
This is the farmer's first consideration.

Wildlife will benefit from these conservation farming practices, b
taking advantage of improved food and cover conditions.

FARM CROPS provide FOOD and COVER for WILDLIFE

FIELD CORN

WHEAT

Standing fields of corn, small grains including oats, wheat, rye and barley, followed by various clover and grass seedings, supply grains and succulent greens required by birds and animals. Soybeans, buckwheat and other farm crops are also important foods.

Nesting cover in the form of permanent grass fields that are not mowed until late summer, is necessary for farm game to reproduce and repopulate the land. The value of growing crops as summer cover cannot be overlooked.

CLOVER

BUCKWHEAT

CONSERVATION PRACTICES FOR PROGRESSIVE FARMS

Progressive farmers are improving their lands by following recommended conservation plans. The following pages with illustrations, show how these practices conserve soil, water and forests and at the same time improve food and cover for wildlife.

Cultivated Fields

(CONTOUR STRIP CROPPING)

Fields are protected from erosion by surveying or "laying out" strips of land from 70 feet to 100 feet wide, depending upon the degree of slope. By using a surveyor's level, the edges of these field strips will be level.

Erosion is then reduced by alternating strips of close-growing crops such as clover and grasses, with corn and cultivated row crops. Farm machinery operates on the level and is less costly to maintain.

Here corn is protected by strips of sod. This variety of vegetation on the same field assures continued food and cover for farm wildlife throughout summer and early fall.

FIELD HEDGES

Field hedges or hedge rows a
shrub plantings often located b
tween contour strips of crop lan
Usually 8 to 10 feet wide, the
strips planted to multiflora ros
regel privet, hazelnut, tataria
honeysuckle and other shrub
spaced 4 feet apart, provide prote
tion against soil loss and water ru
off. Hedges may also be locat
above or below diversion terraces
give added soil protection.

Hedges are utilized by wildli
as travel cover between woodla
and field areas. As the shrubs m
ture, natural foods in the form
nuts, berries and fruits becon
available. Much of this food
utilized by wildlife during wint
months.

LIVING FENCES

(Multiflora Rose)

The multiflora rose or livin
fence, usually between pasture an
crop land, is a hedge and must b
managed as such. Experts recom
mend that 1 year old seedlings b
planted 1 foot apart in a sing
row. These plants are very thrif
and within 5 years, if proper
planted and protected, will provi
excellent wildlife food and cover.

IMPROVED PASTURES

Rough open fields, unsuited to agriculture, are limed, fertilized and disced to improve them for pasture. Often the fields are seeded with a locally recommended grass-clover seed mixture. Wildlife feeds upon the succulent clover growth.

SOD WATERWAYS

Natural drainage ditches or depressions which carry water across cropland during rains are not plowed, but must be protected from erosion by seeding to a grass-clover mixture. Reed canary grass, timothy, tall oats grass, alsike and sweet clover, seeded at the rate of 25 pounds per acre furnishes a very good sod. Fertilizer and lime applications improve the seeding.

Since sod waterways go up and down hill, they provide travel cover for wildlife to use when moving from one field strip to another.

COVER CROPS

Winter cover crops such as rye grass seeded in corn, potatoes or other row crops after the last cultivation, provide green growth and cover which protects the soil from erosion. Sweet clover, millets and other cover crops planted in orchards are equally beneficial. Until such time as they are plowed under for green manure or are harvested, these cover crops furnish food and protection for wildlife.

DIVERSION TERRACES

Diversion terraces are shallo broad ditches established acro sloping fields to divert heavy wat run-off and protect the fields belo from erosion. Terraces are co structed on a very slight grade an are protected on the upper side b a sod filter strip approximately 4 feet wide.

The terrace and filter strip a seeded to a permanent type gras clover mixture and mowed to mai tain a tight sod.

They serve as travel lanes f wildlife to use when moving fro one woodland to another.

HEADLANDS

Headlands are areas at the ends of the fields where farmers turn their equipment. Usually they are shaded or have poor growth due to erosion. When planted to sericea lespedeza, Korean lespedeza or a mixture of permanent grasses, these areas are protected and produce food and cover to attract wildlife.

FIELD BORDERS

Field borders are narrow strips of farm land located along the edges of woodlots or fence rows. Large trees often shade this area and crop growth is very poor.

These borders of unproductive land, usually 25 to 35 feet wide, are often retired from crops by planting low growing shrubs such as bicolor lespedeza, seeding to sericea lespedeza or permanent type grasses and clovers. (See Planting Instructions—back of this issue.)

Farm wildlife will be sure to find these protective plantings.

WINDBREAKS

Windbreaks are rows of evergreen trees and shrubs planted north a west of farm buildings to provide protection from prevailing winds.

By planting at least two rows of Norway spruce, Austrian, red, scot or white pine at 8 x 8 feet spacing in the center, and bordering the eve greens with two or more rows of Amur privet, Tartarian honeysuckle, other shrubs spaced 3 to 4 feet apart, an effective windbreak will established.

Like other plantings of this type, these windbreaks will be populat by many species of wildlife. The evergreen trees furnish cover, and t fruits produced by shrubs provide food.

MANAGED ORCHARDS

Many farmers maintain small orchards, either to supply the family with fruit or to provide a cash crop.

Cover crops such as sweet clover, ryegrass and millet, are usually planted to protect and improve the soil. Pure ladino clover is often seeded and maintained as a permanent sod cover in apple orchards. These crops increase the value of the orchard and produce food and cover for wildlife.

Fruits which fall to the ground, and branches pruned during the winter, will be eaten by cottontail rabbits. Piles of branches provide additional protective cover.

ERODED GULLY

GRASS AND SHRUB PLANTINGS REDUCE GULLY EROSION

GULLY PLANTINGS

Gullies are formed over the year by erosion, and are present on mos farms. Grass-clover sods may b established in shallow gullies to giv immediate control, while shrub and woody plants mature. Any o the recommended permanent grass clover mixtures or lespedeza ma be seeded for this purpose.

Some of the woody plants whic are utilized for general gully control are Tatarian honeysuckle, bayberry, coralberry, black haw, silk dogwood, elderberry and vines suc as fox grape, Virginia creeper an bittersweet. Seedlings may be space 3 x 3 feet or closer to encourag quick control. In very deep gullie banks pine, Virginia pine and blac locust may be planted near th bottom.

These gullies form thickets o woody vegetation and are utilize extensively by farm wildlife.

ODD AREA PLANTINGS

Rock out-crops, sink holes and old foundations are odd areas which may be planted to trees, shrubs and vines. Flowering dogwood, high-bush cranberry, red pine, Norway spruce, black haw, arrowwood, silky dogwood, gray dogwood and fox grape are a few of the species normally planted at these locations. In addition to correcting an eye-sore on the farm, they provide food and cover for wildlife.

EVERGREEN TREE PLANTATIONS

Many farmers plant steep hillsides to evergreen seedlings. When purchased from commercial nurseries and planted during successive years, Norway spruce, Austrian pine, red pine, Scotch pine and white pine will develop into Christmas trees which provide an annual cash crop for the landowner. The hillsides furnish excellent wildlife cover.

FARM PONDS

Thousands of small ponds have been constructed on farms in Pennsylvania. Since most of these serve as fish ponds, and provide fire protection near farm buildings, there has been limited utilization by waterfowl. However, some of the larger areas provide resting areas a well as food and cover for wild ducks and geese. Additional waterfowl foods may be planted along the shorelines. (See Planting Information—back of issue.)

Wet area shrubs and vines, planted to beautify ponds, provide home for all farm wildlife.

MARSH AREAS

These wet areas provide homes for wildlife when planted to reed canary grass and wet site shrubs including silky dogwood, basket willow, red-osier dogwood and highbush cranberry. Where there is sufficient water, marshes may be planted to waterfowl foods.

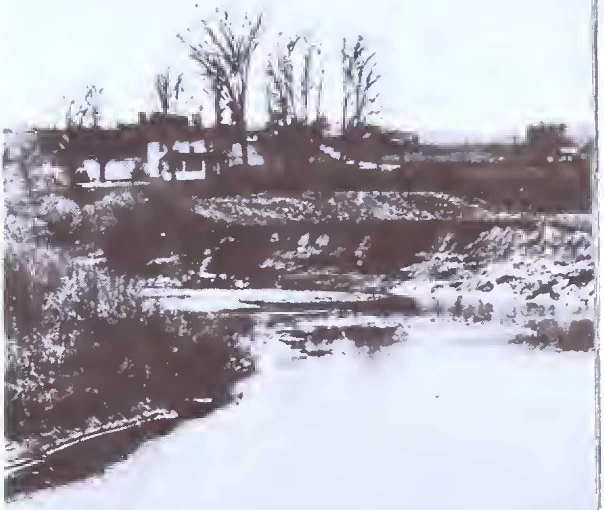
Farm boys trap many muskrats and mink from farm ponds and small marsh areas.

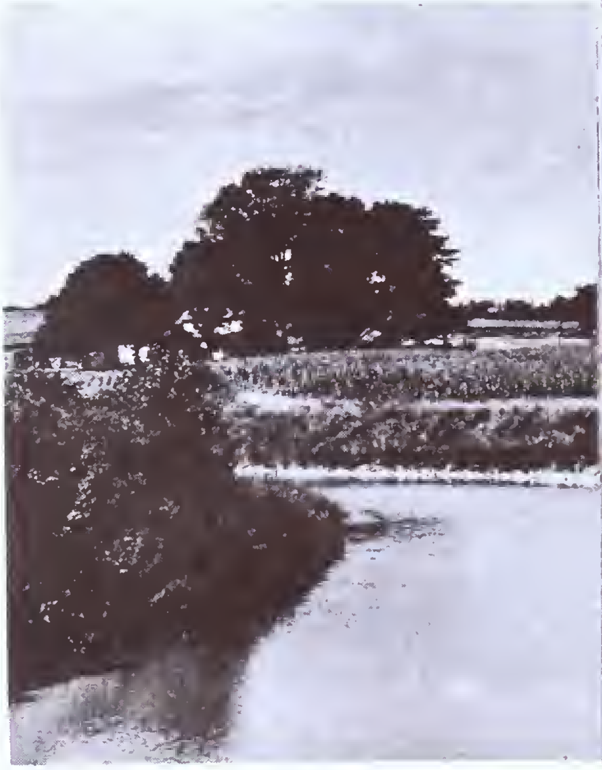
STREAMBANK PLANTINGS

Unprotected streambanks erode and soil is lost during periods of heavy floods.

To correct this condition, streambanks are graded, then planted with red-osier dogwood, silky dogwood, and basket willow spaced 3 feet apart. The banks are then covered with brush mats for protection from washing. The mats are held in place by driving willow stakes into the soil and stretching wire between stakes. The resulting cover reduces loss of soil and provides a home for wildlife.

A well covered streambank adds much to the value of the farm.





WOODLAND BORDERS

Woodland borders usually support tall trees that shade the cro land. By cutting and felling thes larger trees more crops are grown and the remaining shrubs and vine are stimulated to produce good cove and more fruits. Resulting sprout and new reproduction also add t the value of these woodland edges Trees, usually felled for a width o 30′ along the border, may be sol to local timbermen or used on th farm. Tops are piled on the cu area to provide cover for cottontail rabbits. Income from sale o forest products will usually financ the operation.

Practically all trees, shrubs an vines shown in the front of thi issue will be found growing naturally along woodland borders.

WOODLANDS

Timber on woodlot areas must be managed to provide lumber for use in farm building repairs, and to provide a supplemental income for the landowner. By proper selection, mature timber may be utilized and the remaining tree growth improved.

Removal of trees will allow sunlight to reach the forest floor, and stimulate sprout growth and reproduction of blackberry, raspberry, flowering dogwood, thornapple, sumac, witch hazel, ironwood, fox grape and greenbriar, all of which produce food and cover for wildlife.

When removing timber from the woodlot, reserve several hollow trees per acre to provide dens for raccoons, squirrel and cavity nesting birds.

TIMBER SALES

Timber in woodlots should n be sold in a haphazard manne Sales should be planned in advanc Land-owners often receive advi from local district foresters befo obtaining bids covering removal timber from the woodlot.

The owner should control timb operations, either by selling specif trees which are marked, or lim the cut to species and minimu diameters.

Larger timber (usually over inches in diameter at breast heigh may be sold for sawlogs. Small trees are marketed as paperwoo mine props, posts, chemical woo etc.

Usually there is a local mark for forest products. Farmers ma age woodlots the same as any oth crop.

Special Wildlife Practices

In addition to the many conservation practices previously described there are many special activities on the farm that will directly benefit wildlife. A few of these are shown on the following pages.

STANDING CROPS FOR WINTER FOOD AND COVER

Wildlife must survive severe winter weather. By allowing a few rows of corn along field edges to remain standing over winter, the landowner supplies supplemental food and cover which may mean the difference between an abundant or limited game supply.

FOOD STRIPS

On many farms there are sma isolated narrow fields on which does not pay to raise crops. O these areas sorghum, millet, su flower and other grains may b planted to provide food and cov for wildlife. Sportsmen often su ply the seed and assist farmers establishing these food strips.

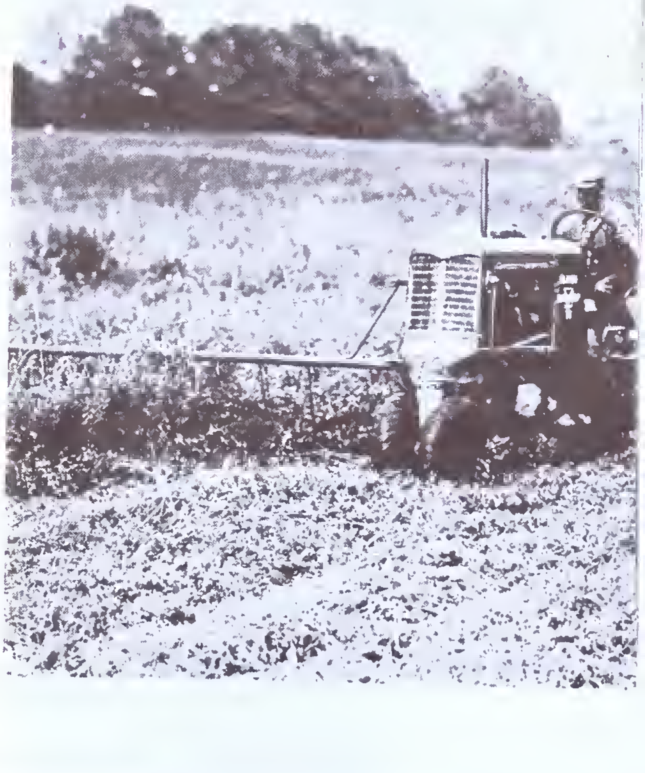
(For additional planting inform tion, see back pages of this issue.)

SAVE NESTING WILDLIFE

Ringneck pheasants and bobwhite quail nest in hay fields. Each year many are lost and the eggs destroyed during mowing season. The greatest mortality of most wildlife occurs during the summer.

Farmers are urged to allow islands of hay to stand around nests which have been located.

Flushing bars are now available for fast moving farm machinery. Some success has been reported from the use of the Ohio flushing bar. These bars, located ahead of the mowing blade, will flush the hen bird and allow the farmer to locate and save the nest.



PREVENT FIELD FIRES

Humus and nutrients essential farm crops are destroyed by groun fires. In addition, wildlife perish these blazes or have their young ar future homes destroyed. Preve fires, improve your soil and sa wildlife.

ATTRACT SONGBIRDS

Many farm families enjoy t color and activities of songbir outside their dwellings. Duri winter months they can attract a hold a variety of these feather friends by establishing small fee ers in nearby shrubbery.

CORNSHOCKS AND WILDLIFE

An occasional shock of corn left standing against a fence or along woodlot edges may save a covey of quail.

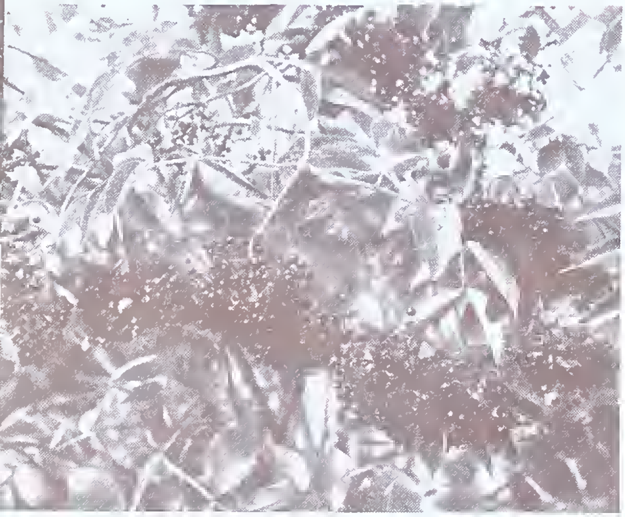
Scratch grain or sweepings from the barn floor, along with a supply of grain or fine gravel, should be placed under the protected side of corn shocks to provide additional food.

FIELD EDGE PLANTINGS

Interested landowners may supply additional food along hedges and field edges by planting a few handfuls of broom corn, amber sorghum or sunflower in the outside corn rows.

FLOWERING DOGWOOD

TREES, SHRUBS *and* VINES *provide* *Essential Wildlife Foods*



ELDERBERRY

WILD PLUM

BLACKBERRY

These pages show the fruits and growth of a few trees, shrubs and vines which provide food for wildlife.

Cottontail rabbits will cut the tender sprouts and eat bark from the branches of many trees, shrubs and vines.

During summer months the foliage provides protective cover. The fruits are available during late summer, fall and winter months.

HICKORY

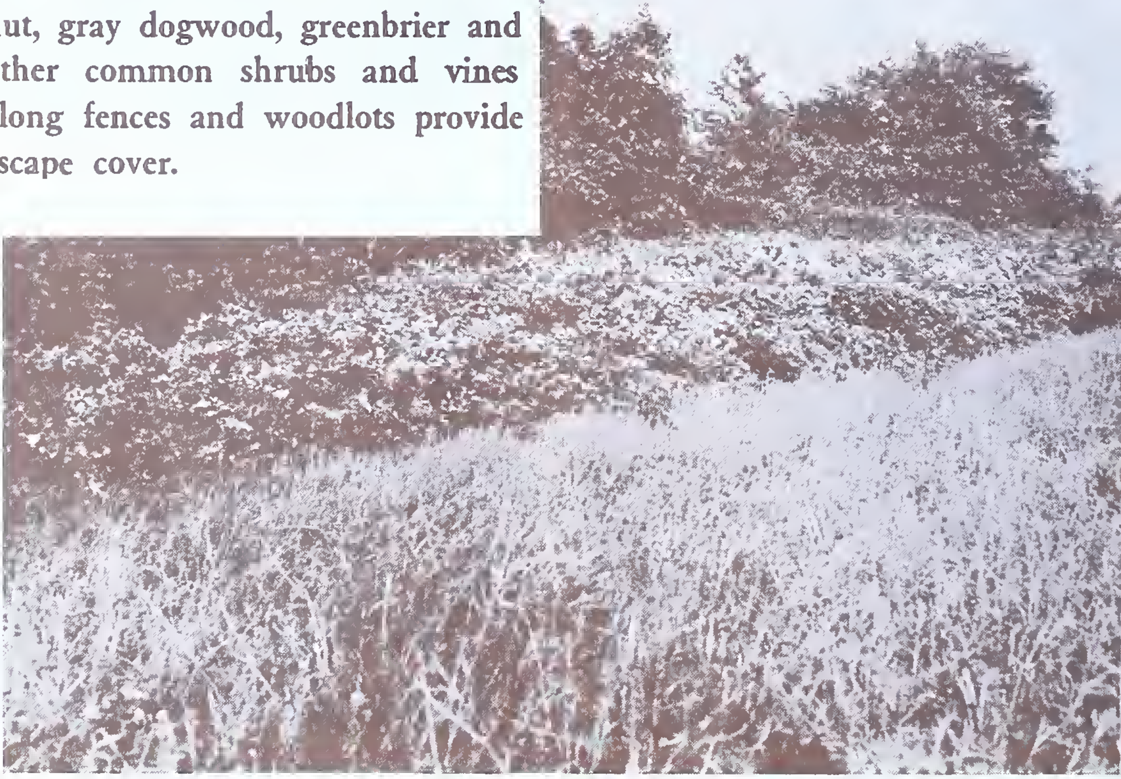
WILD CRABAPPLE

SUMAC

FOX GRAPE

Evergreen tree plantations provide cover for wildlife and a source of income to the farmer.

Reproduction of blackberry, hazelnut, gray dogwood, greenbrier and other common shrubs and vines along fences and woodlots provide escape cover.



PROTECTIVE COVER IMPORTANT FOR WILDLIFE

Evergreen trees in their early growth provide escape cover. Hedges, fences, woodlot borders, gullies, steep slopes and stream banks covered with low woody vegetation and weeds form travel lanes, nesting, brooding and escape cover for all farm wildlife.

Natural reproduction of white pine, hemlock and laurel provide excellent cover in woodlot areas.

Black locust, flowering dogwood, wild crabapple, thornapple, witch hazel, maple, hickory, greenbrier and wild grape are some of the more common trees, shrubs and vines which normally grow in gullies. Farm wildlife is usually present in these thicket areas.

CHAPTER II

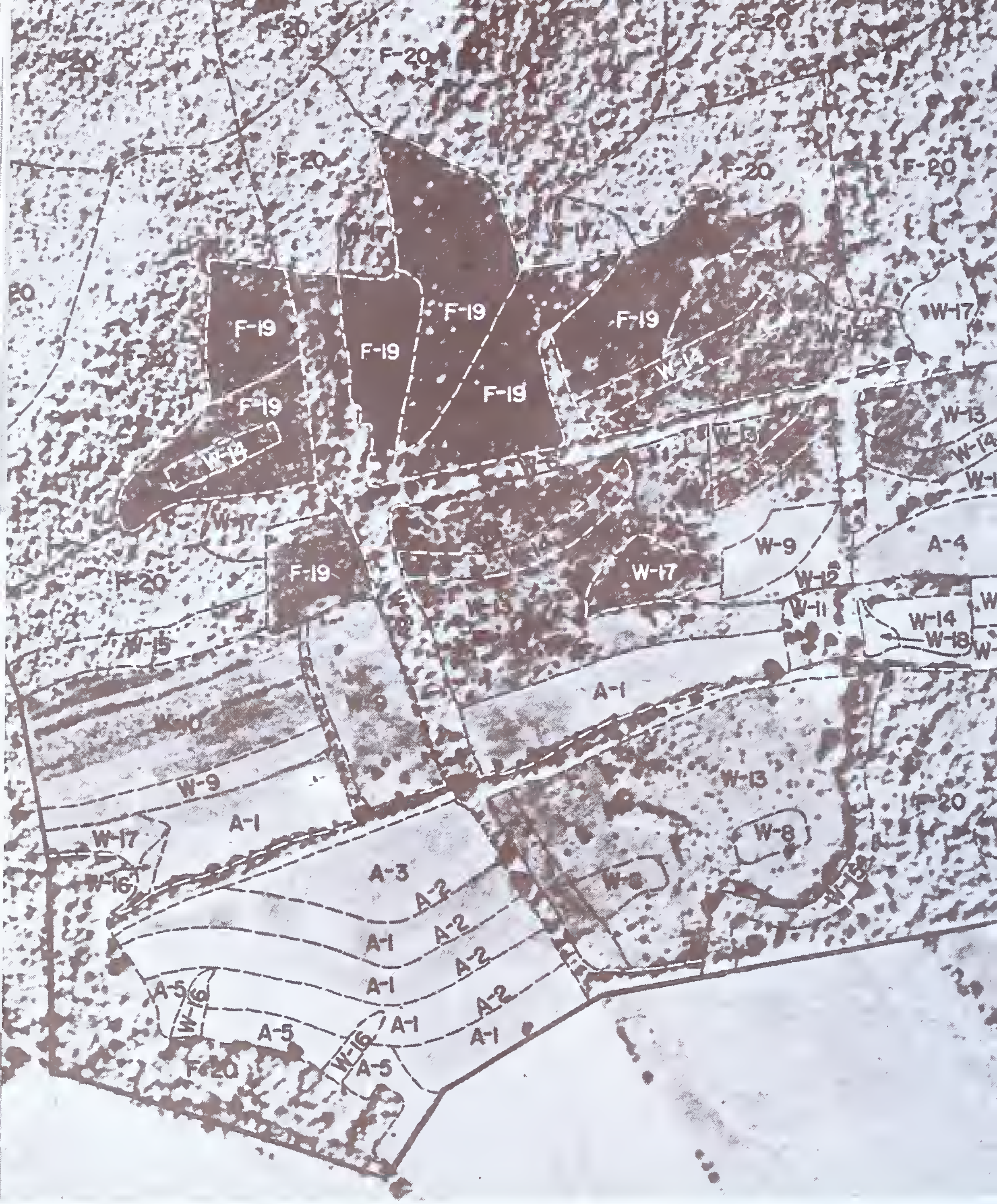
Food and Cover for Wildlife on Marginal and Submarginal Farm Areas

Consideration must be given to food and cover development for wildlife on the poorer agricultural lands, often referred to as marginal or submarginal farms. Naturally the treatment is different from practices approved for the better farms, since the primary objective is not profit from farm crops but to develop the area for wildlife.

Many hunting clubs, after purchasing old farms, have written to the Pennsylvania Game Commission requesting suggestions for improving these lands for wildlife. Therefore, this portion of the issue should be of interest to many sportsmen.

The following pages will present suggested practices that may be applied to marginal or submarginal areas on which soil erosion and reduction of humus has made many of the fields unproductive of farm crops.

Proper management of agriculture, wildlife and woodland areas will increase the value of submarginal farms as hunting and dog training areas. Many of the operations will be self-supporting, but others will require work by the landowner or sportsmen's group interested in this development.



The above picture is an aerial view of a typical marginal or submarginal farm in southern Pennsylvania.

To make this productive for wildlife a definite land-use plan must be followed. Development as recommended on the next sheet indicates various practices which the owners may apply.

Recommended Development Practices

A - AGRICULTURAL AREAS

A-1 Farming Fields
A-2 Planting Field Hedges
A-3 Planting Permanent Sod
A-4 Planting Nut Tree and Fruit Orchards
A-5 Planting Field Edges and Odd Corners

W - WILDLIFE AREAS

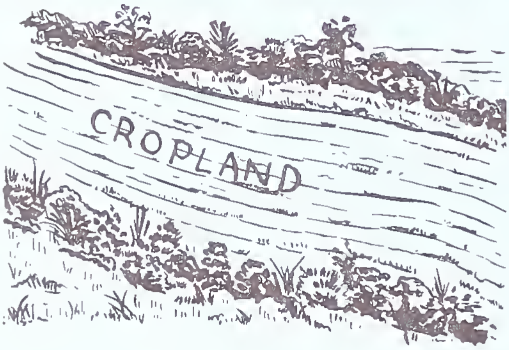
W- 6 Improving Fence Rows
W- 7 Planting Streambanks
W- 8 Planting Waste Areas
W- 9 Planting Permanent Clovers
W-10 Planting Evergreen Trees
W-11 Managing Old Orchards
W-12 Improving Clover Growth on Untilled Fields
W-13 Improving Shrub Growth on Untilled Fields
W-14 Planting Food Strips
W-15 Cutting Woodland Borders
W-16 Planting Gullies
W-17 Releasing Shrubs and Vines—Woodlot Areas
W-18 Developing Water Supply and Ponds

F - FOREST OR WOODLOT AREAS

F-19 Managing Reverted Fields
F-20 Improving Woodlots Through Timber Sales

SUCCEEDING PAGES DESCRIBE EACH DEVELOPMENT PRACTICE INDICATED ABOVE.

Development of Agricultural Areas



A-1 FARMING FIELDS

Locations indicated on the picture by the number A-1 are the better soil sites with little erosion. Local farmers are usually interested in a share-cropping agreement, whereby they farm fields on a crop rotation basis, planting corn with ryegrass cover crop one year, wheat or oats the second year and then seeding clover which should stand two or more years.

In return for the use of these fields, the landowner may either take a share of the harvested grains, or arrange for the share-crop farmer to plant other food strips each year without charge.

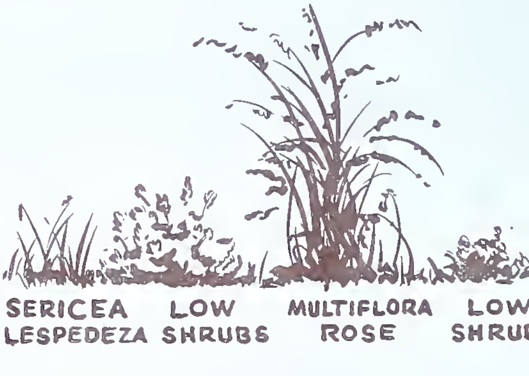
A-2 PLANTING FIELD HEDGES

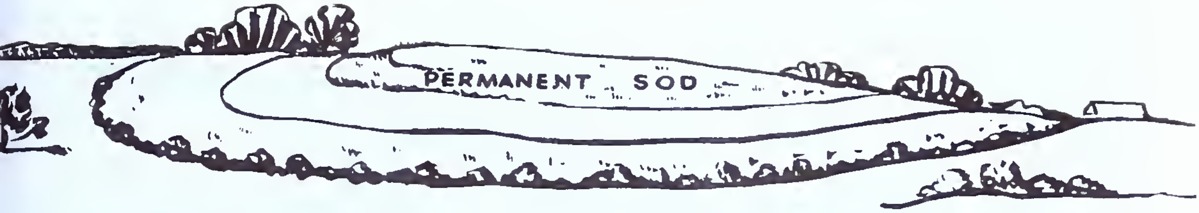
Establish contour hedges approximately 36 feet wide between crop fields.

Tatarian honeysuckle, arrowwood, Regel privet and multiflora rose are often used for the center rows. Bicolor lespedeza coralberry and hazelnut may be planted next, with the outside strip seeded to sericea lespedeza. Other shrubs may be substituted (see back of issue).

On open field areas these wide hedges provide wildlife with natural food and cover adjacent to cropland.

DESIGN FOR HEDGE





A-3 PLANTING PERMANENT SOD

Permanent grass-clover areas should be maintained above steep fields. To establish, plant small grains with adjoining crop land, then seed permanent type grass-clover mixture the following spring. Mow areas late each summer to stimulate succulent growth (farmers will usually handle this mowing with their share crop activities).

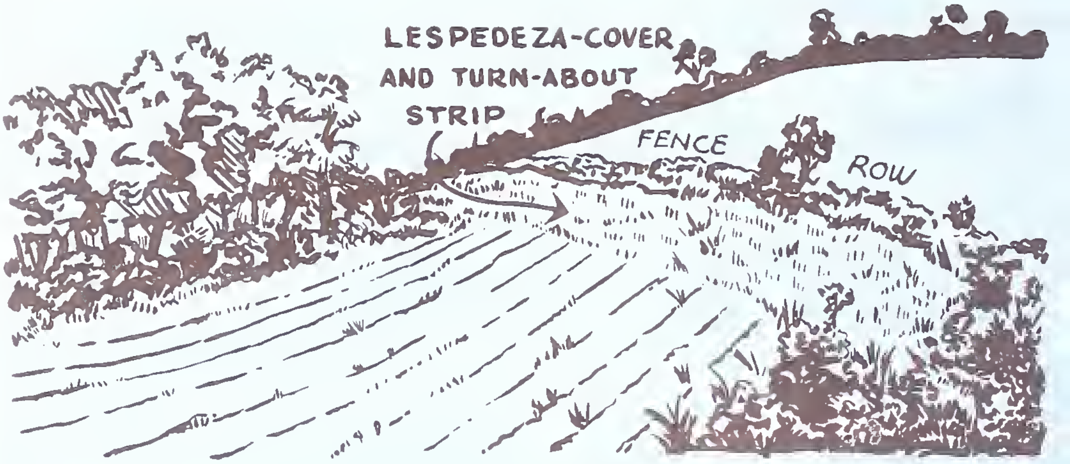
These areas are utilized by nesting birds and rabbits. The importance of open sites, which produce greens and insect life for young birds to feed upon, cannot be too highly stressed.

A-4 PLANTING NUT TREE AND FRUIT ORCHARDS

Trees and shrubs, including walnut, hickory, Asiatic chestnut and filbert, may be planted as orchard crops. The nut yield may either be left for wildlife or sold to pay development costs. Nurserymen will furnish specific planting instructions.

Areas between rows should be cultivated and seeded to clovers. Mow annually, mulch trees with hay and weeds. Prune to provide shape and room underneath for cultivating and harvesting.

Apple trees also provide an important wildlife food. Fallen fruits and pruned branches are eaten by rabbits during fall and winter months.

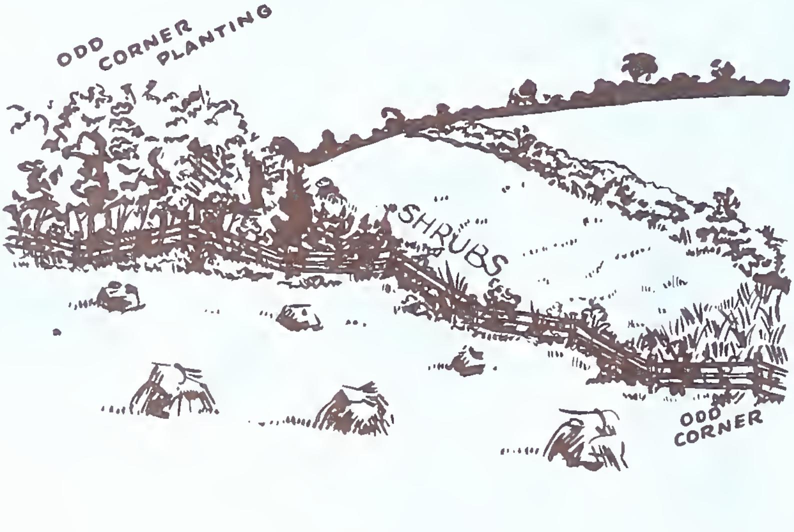


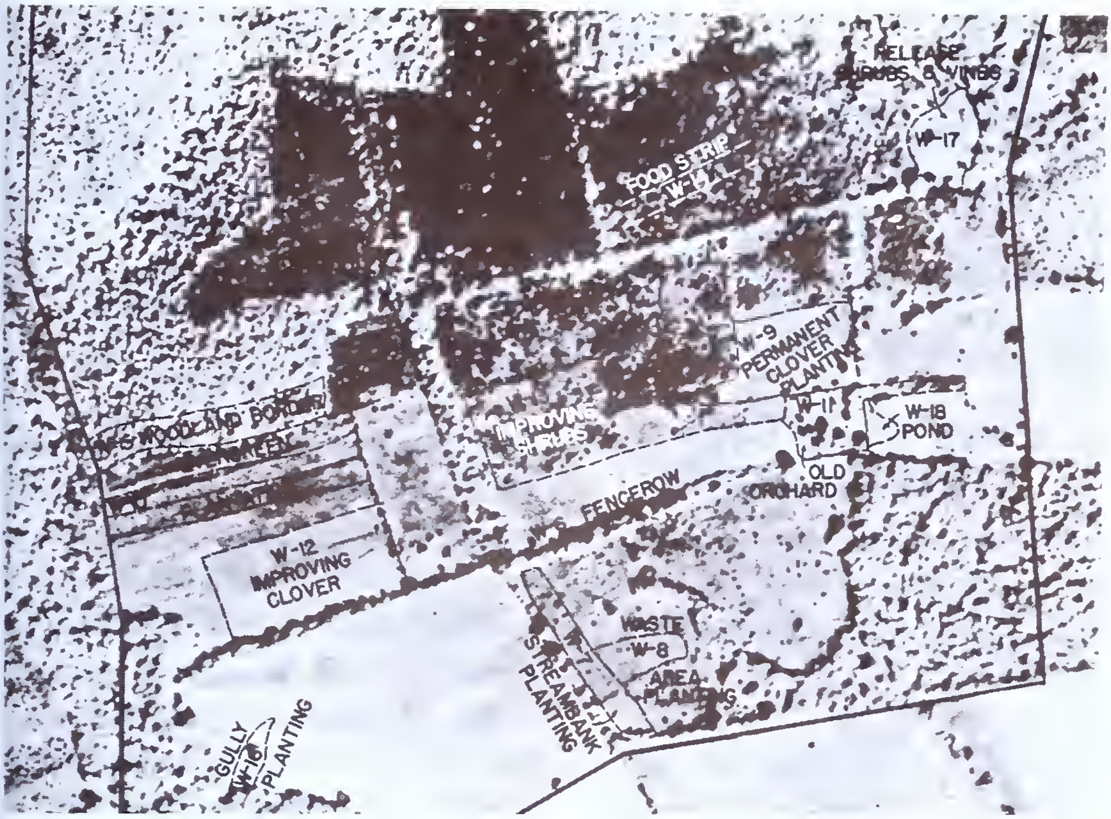
A-5 PLANTING FIELD EDGES AND ODD CORNERS

Field edges adjacent to fence rows or woodland borders are improved for wildlife by having the farmer seed a 30′ food strip to sericea lespedeza or a grass-clover mixture. He can turn his equipment on these field ends. (See Planting Instructions—back of this issue.)

When fields are contoured odd corners of ground are left at various locations. These may either seeded to sericea lespedeza, a p manent grass-clover mixture planted to any one or combinati of the shrubs mentioned for hed row plantings.

It is wise to retain a portion the odd field areas in grasses a clovers in order to provide nesti sites for wildlife. Often natural production of shrubs and vines w improve the food and cover on th sites.



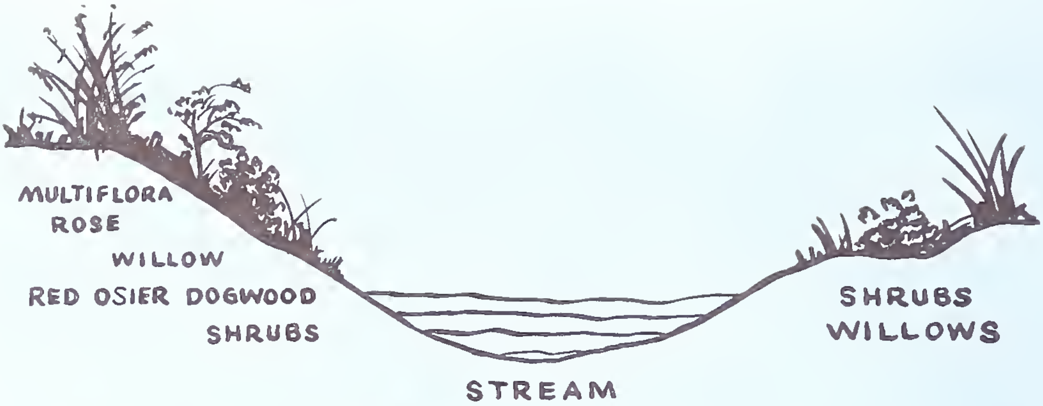


Development of Wildlife Areas

W-6 IMPROVING FENCE ROWS

Old fence rows usually contain a mixture of shrubs which are shaded by large maple, aspen, ash, locust and oak trees. By felling the larger trees, the mature shrubs and vines such as gray dogwood, blackberry, raspberry, choke cherry, silky dogwood, sassafras, flowering dogwood, grape and greenbriar will receive sunlight and increase their fruit yield. Limbs and tops arranged in large piles provide excellent rabbit cover.

Several rows of low growing shrubs may be planted on either side of mature fence row cover to increase width and type of wildlife food and cover.



W-7 PLANTING STREAMBANKS

Streambanks are natural locations for wildlife to utilize. Many are badly eroded and will be improved by planting with shrubs native to wet soils.

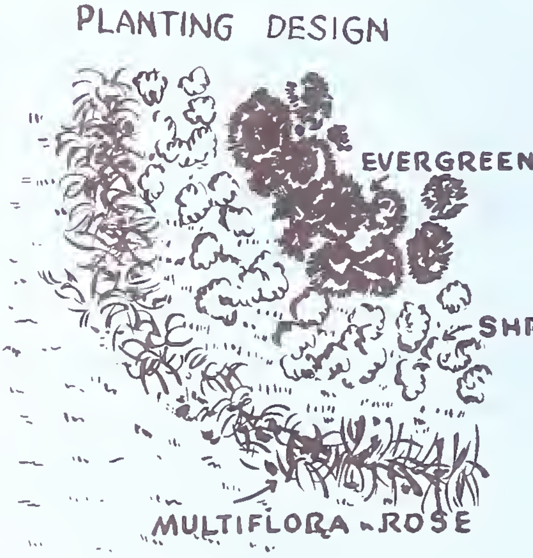
When correcting the eroded areas, first slope the banks. Then plant with basket willow, elderberry, re osier dogwood, and silky dogwoo spaced 3 x 3 feet. Mulch bank wit branches held in place with willo stakes and wire. A row of multiflo rose, spaced 3 feet apart, plante along the top of the bank will giv added protection and increase foo and cover for wildlife.

W-8 PLANTING WASTE AREAS

Sink holes, old building foundations, rock piles in fields, and rock outcrops are found on many farms.

These locations provide retreat areas and produce excellent food for wildlife when trees, shrubs and vines become established.

On large areas 30 or more evergreen trees such as Norway spruce, red pine and Scotch pine may be planted in the center, spacing them 8 feet apart, to provide year aroun cover. Thornapple, multiflora ros arrowwood, silky dogwood, gra dogwood and hazelnut are seedlin suggested for planting around th evergreens, spacing them 4 fe apart for best results.



W-9 PLANTING PERMANENT CLOVERS

Many hillside areas are eroded and cannot be reclaimed for agriculture. At these locations the variety of wildlife food and cover will be improved by seeding the steepest slopes to sericea lespedeza, Korean lespedeza or crown vetch. Patches from one-half to two acres in size are not too large.

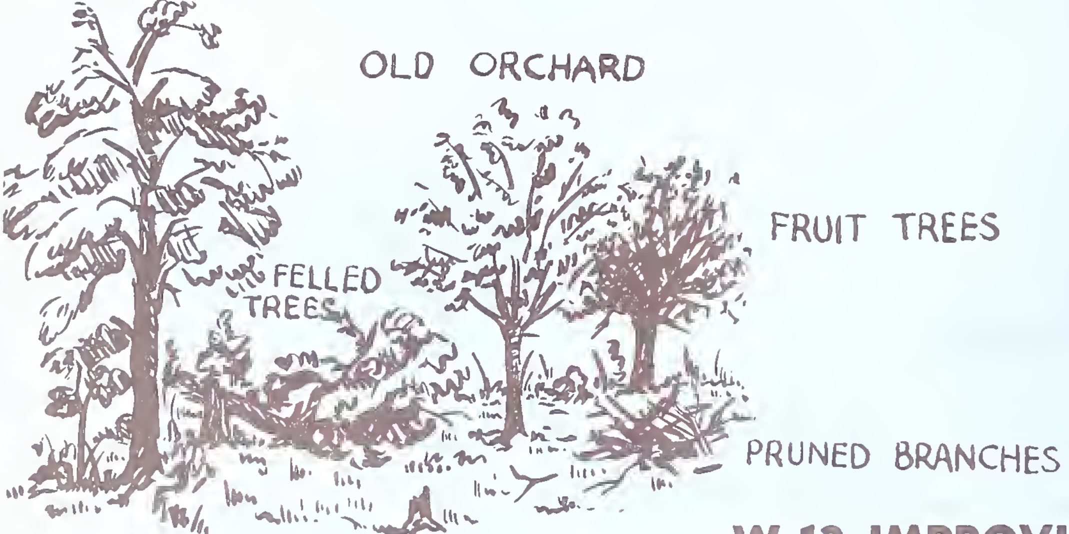
Lespedeza and crown vetch seed is difficult to purchase, but local seedmen may be able to obtain it from larger supply houses.

W-10 PLANTING EVERGREEN TREES

Landowners and organized clubs should plant evergreen seedlings to provide protective cover strips on untilled fields.

By planting a thousand or more seedlings, spaced 5 to 6 feet apart, each year, trees of different sizes will soon be growing in the fields, assuring the best cover for wildlife and a continuous harvest if the owner wishes to sell them annually for Christmas trees.

Austrian pine, red pine, Scotch pine, white pine and Norway spruce are sold in various sizes over 3 feet tall for Christmas trees. Seedlings for this purpose must be purchased from commercial nurserymen. Proceeds from the sale of trees will help finance other development work, while the standing evergreens continue to provide cover for farm wildlife.



W-11 MANAGING OLD ORCHARDS

Old orchards usually provide a variety of food and cover attractive to all farm wildlife.

Release apple trees from overshadowing tree growth by felling maple, ash, locust, aspen and other timber which has become established in neglected orchards. Pile the tops for cover. Prune all fruit trees during winter months, piling the branches to provide food and cover for rabbits. Fallen fruits, particularly apples, furnish food for practically all forms of wildlife.

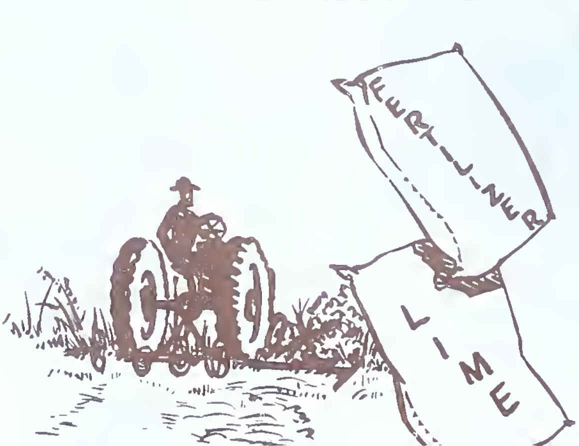
The importance of managing orchards cannot be over-emphasized.

W-12 IMPROVING CLOVER GROWTH ON UNTILLED FIELDS

Many untilled field areas on su marginal or marginal lands shou be retained as open areas. The fields provide nesting sites and variety of succulent foods and i sects required by farm wildlife.

Mow selected fields in mid-sum mer each year—or, if costs are pr hibitive, do the job once every thre years to retain it in sod.

Succulent growth can be im proved by broadcasting approx mately 300 lbs. of complete fertilize and 2000 lbs. of lime per acre. Dis following application. Seed lightl (1 to 2 lb. per acre) with whit Dutch and Ladino clover seed t improve the quantity and qualit of wildlife food and cover.



W-13 IMPROVING SHRUB GROWTH ON UNTILLED FIELDS

Many reverting fields are grown to scattered trees, shrubs and weeds.

To prevent the field from becoming a forest, and to improve the production of fruits and berries by shrubs, requires removal of the large seed trees. The landowner should fell all trees such as maple, ash, locust, and elm, piling the brush in very large piles for rabbit cover.

Hazelnut, thornapple, wild crabapple, wild plum, arrowwood, gray dogwood, flowering dogwood, huckleberry and blackberry are some of the more valuable shrubs that will benefit by this operation. When sufficient sunlight reaches the plants, they will produce increased food and cover for wildlife.

W-14 PLANTING FOOD STRIPS

Marginal or submarginal farms include fields not suited to rotation farming. Many are grown to scrub pine, elm, maple, ash and other tree species, and are located some distance from cropland.

In order to increase the wildlife population it is essential to establish scattered food strips containing grains and clovers.

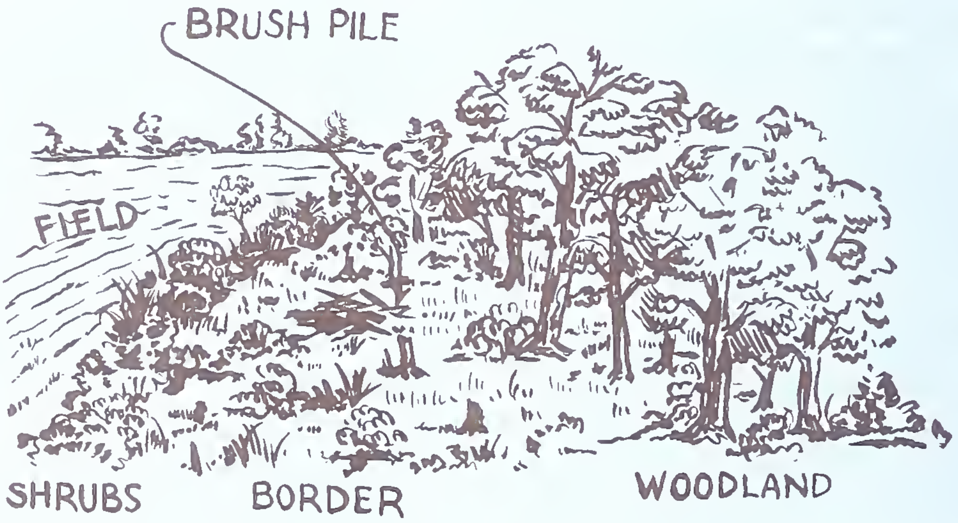
The suggested practice is to clear strips varying from 60 to 100 feet wide. Locate on the contour. Pile tops and stumps on the lower half of the clearing, then plant grains on the upper half of the strip and seed to clovers and grasses. Most of these areas have poor acid soils and will

benefit by the application of fertilizer and lime.

Planting recommendations in the back of this issue may be followed. However, if the soil is fertile and enough lime has been applied, seed to Ladino clover (2 lbs. per acre) or a Ladino-Alsike clover mixtur of 3 lbs. per acre.

Mow clovers at least once eac year, preferably in July, to increas succulent growth.

Fell any trees shading the foo strips, and pile tops for cover.

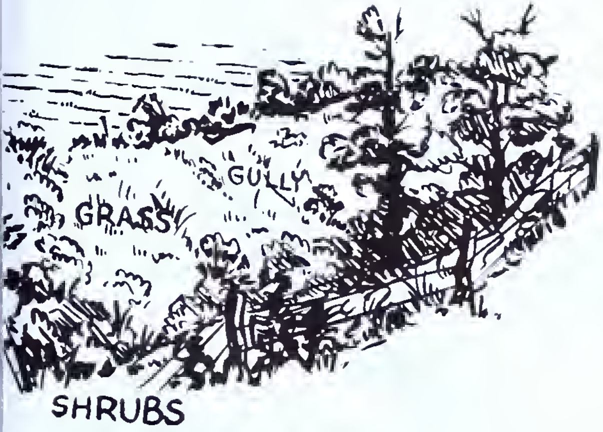


W-15 CUTTING WOODLAND BORDERS

Edges of woodlots contain natural growth of many shrubs and vines which produce berries and nuts. When trees become large and shade the border, they reduce the fruiting of this woody vegetation.

On these woodland borders landowners should remove all trees for a width of 30 feet along the edge. Local timbermen will often cut the trees and pay for wood products removed, thus financing the in provement. Save all shrubs an vines. Pile tops on the strips fe rabbit cover.

Flowering dogwood, blackberr thornapple, silky dogwood, arrov wood, gray dogwood, greenbri and fox grapes, are some of tl shrubs and vines that will thrive c the border, providing excellent foc and cover for wildlife.



W-16 PLANTING GULLIES

Gullies are ditches or miniature valleys formed by water erosion and may be found on practically all farms.

If they are shallow, disc and seed to perennial grasses and clovers. Then plant shrubs spaced 3 feet apart. Tatarian honeysuckle, silky dogwood, blackhaw, and gray dogwood are shrubs that may be used, with Multiflora rose as the outside row.

In very deep gullies the bottom may be planted to basket willow, elderberry, etc., the lower slopes to banks pine and black locust and the upper slopes to shrubs listed in the preceding paragraph.

By planting these areas, erosion is reduced. The resulting plant growth produces food and cover for wildlife.

W-17 RELEASING SHRUBS AND VINES—WOODLOT AREAS

Shrubs and vines produce more fruits and a heavier foliage when growing in the open where sunlight reaches the plants.

A wildlife development practice recommended for woodlot areas is to fell large trees which shade clumps of flowering dogwood, thornapple, wild grape, greenbriers, etc.

Where vines are present, fell trees on large piles to provide natural arbors. Drop trees with vines on top of pile.

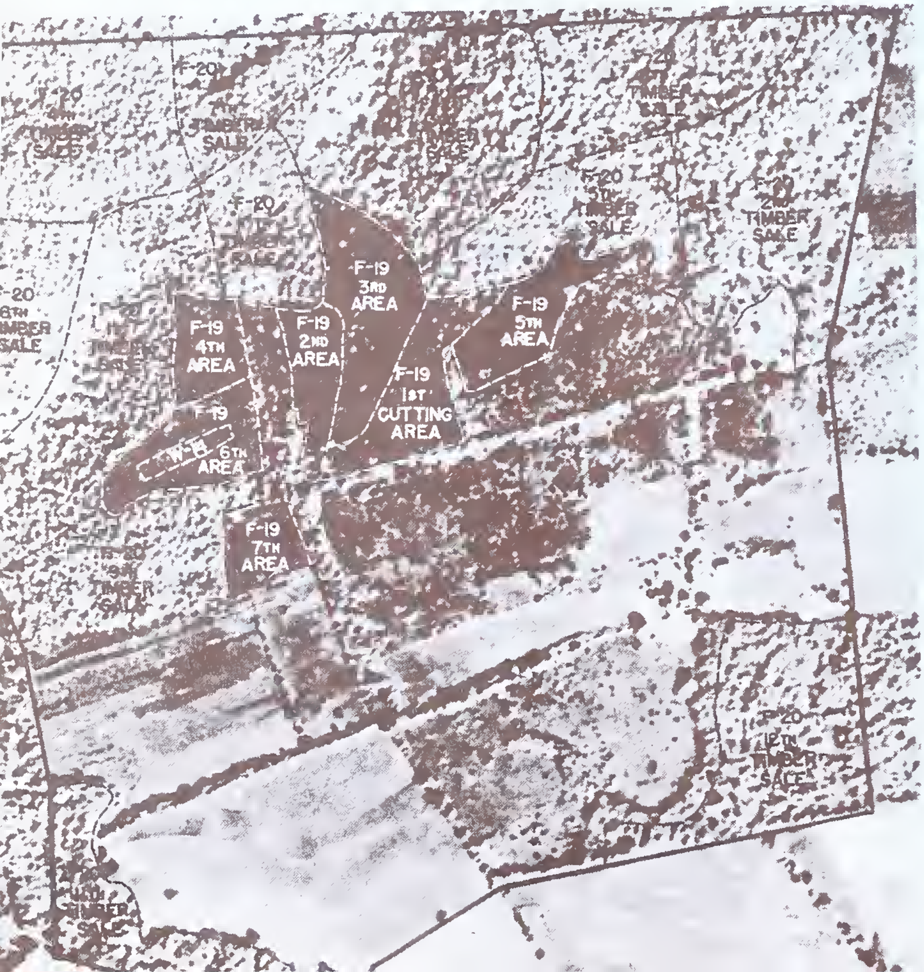
Clumps of shrubs are best released from competitive growth by felling trees away from the shrubs or cutting and piling the tops.

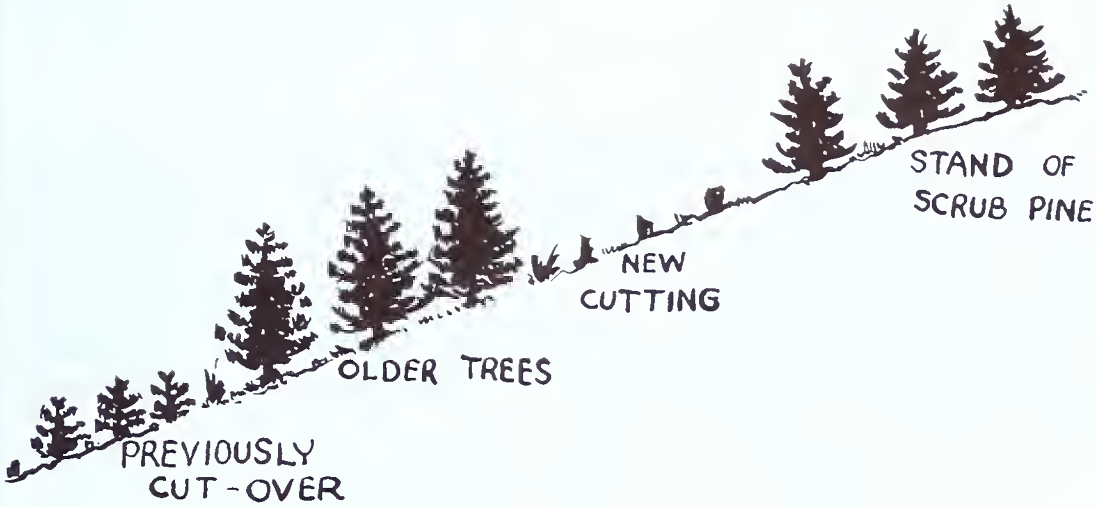
W-18 DEVELOPING WATER SUPPLY AND PONDS

It is often desirable to build small ponds near farm buildings or club-houses to improve fire protection and provide fishing. Plantings of red osier dogwood, basket willow and other wet area shrubs at the upper end of the pond increases food and cover for wildlife.

Where ponds are large enough, waterfowl foods such as smartweed wild duck millet, etc., may be planted. (See back of issue for list o materials).

DEVELOPMENT OF WOODLOT AREAS





F-19 MANAGING REVERTED FIELDS

Forests which have developed on old fields, through natural seeding, quite often are solid stands of scrub pine.

On these areas, narrow strips or small blocks of trees should be sold for paperwood, spacing the cuttings several years apart.

Shrubs and vines, including flowering dogwood, thornapple, wild crabapple and wild grape will thrive on the timbered areas. Tree tops furnish brush piles.

By cutting these narrow strips, the surrounding trees will seed in the opening, thus providing new pine growth which produces wildlife cover and timber for the future.

F-20 IMPROVING WOODLOTS THROUGH TIMBER SALES

Periodic sales of select timber in a farm woodlot will greatly improve the forest.

The owner should control timber operations, either by selling specific trees which he has marked, or limit the cut to definite species and minimum diameters. Advice from local foresters will help protect your investment.

Larger timber (usually over 12 inches in diameter) may be sold for sawlogs, while the smaller trees and tops may be marketed as paperwood, mine props, posts, etc. Profits help finance other wildlife practices.

Removal of large trees stimulates sprout growth and reproduction of trees, shrubs and vines, thus improving food and cover for wildlife.

Please note that cutting blocks are indicating on the plan. By selling several acres every five years, continuous food and cover will result. Harvesting of all trees on smal scattered plots of approximately on acre provides slashings or cove strips, which will be utilized b wildlife for nesting and escape cover

Since squirrels, raccoons and many cavity nesting birds require hollow trees for their homes, provisions should be made to retain at least two den trees per acre.

Planting and Miscellaneous Information

FOOD STRIPS FOR WILDLIFE

For those farmers, sportsmen and naturalists wishing to establish food strips, the following plantings are recommended for various species of wildlife. Planted according to directions, the supplemental food and cover produced by the plots will greatly improve wildlife habitat.

MIXTURE TO PLANT FOR QUAIL AND SONGBIRDS

	lbs.
Broom corn millet, Japanese millet or German millet	3.5
Broom corn or Midland grain sorghum	2.5
Amber sorghum	2.5
Sunflower	1.5
Mixture to seed 1 acre	10.0

In the seed mixture either one of the millets or a mixture of the three may be used, depending on which varieties can be purchased. The same pertains to the possible use of broom corn or midland grain sorghum.

Planting instructions: Plow in May, apply 400 lbs. of complete commercial fertilizer and 1 to 2 tons of lime per acre as needed, harrow, broadcast seed mixture at the rate of 10 lbs. per acre, and cover by light harrowing.

This mixture is primarily intended for small birds but the resulting food and cover will be utilized by all farm wildlife.

Plantings for Rabbit Food and Nesting Cover

OATS SEEDED WITH ONE OF THE FOLLOWING MIXTURES

MIXTURE NO. 1

	lbs.
Orchard Grass	2
Redtop	2
Red Clover	2
Timothy	4
Alsike Clover	1
	—
Total	11

MIXTURE NO. 2

	lb
Sweet Clover (yellow or white top)	
Timothy	
Alsike Clover	
Orchard Grass	
Redtop	
Red Clover	
Total	

Each Mixture will seed one acre.

Planting instructions: Plow April 15 to May 15, apply 2 tons of lim if needed, harrow and seed 1 bushel of oats per acre and one of th mixtures, using 300 to 400 pounds of complete analysis commercial fe tilizer per acre.

Note: If it is necessary to plow in the late summer or fall, winter whe may be planted, then seeded the following spring to the proper grass-clov mixture or to clover.

The oats and wheat should be left standing in the field thus providi excellent food for all wildlife. The seeding of clovers and grass will n only furnish food but also nesting cover.

It is recommended that a strip at least 12 feet wide be mowed along tl edges of these clover-grass strips each year. Mow after the nesting seas is over to produce succulent green growth.

PLANTINGS FOR RINGNECKED PHEASANTS

Since standing field corn, soybeans, and buckwheat provide food and cover most desired by ringnecked pheasants, the following recommendations for planting are made:

1. FIELD CORN AND SOYBEANS IN ROWS.

Planting instructions: Plow in May, spread 1 to 2 tons of lime per acre if needed, harrow, plant 6 to 8 lbs. of field corn seed and 1 peck of soybean seed in the following spacings, utilizing the pea and bean attachments of the corn planters. Apply 300 to 400 lbs. of complete commercial fertilizer per acre in rows with the corn.

(a) Two (2) grains of corn and 1 to 2 soybean seeds per hill spaced 36 inches apart in the rows; or

(b) One (1) grain of corn to every 12 or 16 inches of row and 1 soybean seed every 6 to 8 inches of row.

Cultivate the field at least twice.

2. FIELD CORN IN ROWS, WITH SOYBEANS OR BUCKWHEAT BROADCAST BEFORE THE LAST CULTIVATION. (Use of Buckwheat in norther tier counties and soybeans in the southern half of Pennsylvania is recommended).

Planting instructions: Plow in May, spread 1 to 2 tons of lime per acre if needed, harrow, plant 6 to 8 lbs. of field corn seed per acre in rows, using 300 to 400 lbs. of complete commercial fertilizer. Space the corn one seed every 12 to 16 inches in the rows, which should be 42 inches apart.

Cultivate at least twice. Just before the last cultivation, broadcast 1 bushel of soybean or buckwheat seed (this should be done before the corn is 20 inches high). The last cultivation will cover the seeds.

OTHER FOOD STRIPS

All wildlife, including deer, wild turkeys and grouse utilize food stri planted on submarginal fields near heavily wooded ridges. A fall or wint grain seeded to clovers and grasses is particularly beneficial at these locatior

WINTER WHEAT SEEDED TO CLOVER

Planting instructions: Plow during August or early September, app two tons of lime per acre if needed. harrow, drill in 10 to 12 pecks winter wheat seed during September and 300 pounds of complete cor mercial fertilizer per acre. (Heavier wheat planting for deer pasture)

No. 1
For Northern Half of Penna.

	lbs.
Birdsfoot Trefoil	4
Alfalfa	3
Alsike Clover	1
Ladino Clover	1
White Dutch Clover	1
Total	10

No. 2
For Southern Half of Penna.

	l
Alfalfa	
Red Clover	
Ladino Clover	
White Dutch Clover	
Total	

Each mixture will seed one acre, and should be seeded on the whe early the following spring.

Plots seeded in this manner provide green growth which is eaten wildlife in late fall and early spring, grain for summer consumption a clover growth the following seasons. In addition these open fields shou increase the insect life, which is an important summer food for wild bir

Pure stands of clover may be seeded instead of the suggested mixtu Ladino clover provides excellent food for wildlife. It may be seeded alo at the rate of 2 to 3 pounds per acre. For other mixtures consult your loc seedman or county agriculture agent.

Hairy vetch planted in the fall at the rate of 30 pounds per acre wit one bushel of rye seed provides food that will attract cottontail rabbi from a considerable distance.

PLANTING SERICEA LESPEDEZA

Sericea Lespedeza is a deep rooted, bushy perennial standing 2 to 4 feet in height with greenish yellow flowers. It is a native of Asia and was first grown in this country in the year 1896. It is well adapted in southeastern Pennsylvania.

Although seed does not mature in northern Pennsylvania, it produces excellent cover.

Unscarified seed should be planted a month earlier than scarified seed, preferably before May 15th, at the rate of 15 to 20 pounds per acre. All Sericea Lespedeza should be inoculated. Sow with a nurse crop such as oats, planted at the rate of 4 pecks per acre on a prepared seed bed, and fertilize with 300 to 400 pounds of complete analysis fertilizer. It has done well in southern Pennsylvania when seeded in the spring on fields of winter wheat.

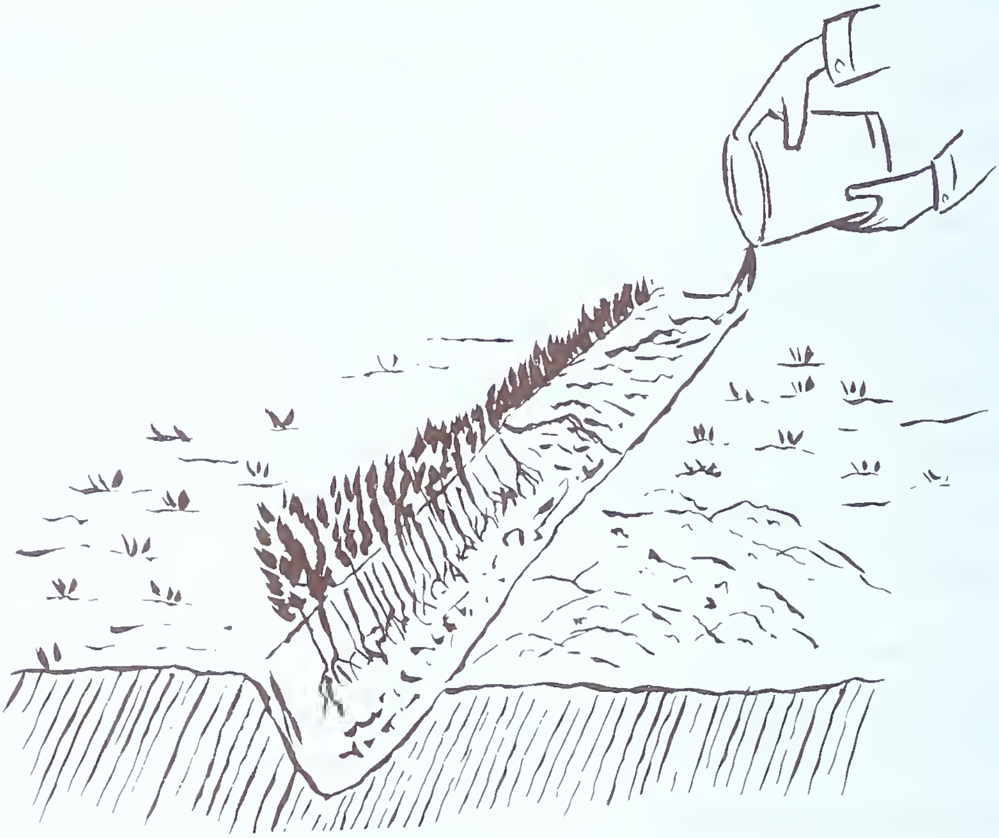
If the site is severely eroded a light pine cover, grain straw, or other mulch, is recommended for temporary protection. Sometimes three (3) years are required for a good stand. It survives where drought even kills alfalfa and Korean Lespedeza. It is not recommended for a hay crop in Pennsylvania. It prefers well drained clay loams or heavy silt loams. Lime helps but is not essential. Its ability to withstand shade in the dead strip, or eroded unproductive field border between cultivated fields and woodland, makes it very useful.

Sericea Lespedeza contains good nesting cover when young and the seed is available to wildlife in the winter. The plant is eaten by rabbits and the quail and songbirds eat the seeds.

Growth of the stand the first year is 4″ to 14″, the second year 20″ to 48″, with seed in profusion.

PLANTING SEEDLINGS

Tree, shrub and vine seedlings are received from the nurseries bundles with the roots wrapped in moist moss or other protective cov When the shipment arrives, break the string that holds each bundle ar heel-in all plants as outlined below, completing the field planting as so as possible.



a. Dig a sloping trench.

b. Place thin layer of trees against sloping side (approximately 100 trees per linear foot of trench).

c. Cover roots with moist soil ar pack soil firmly.

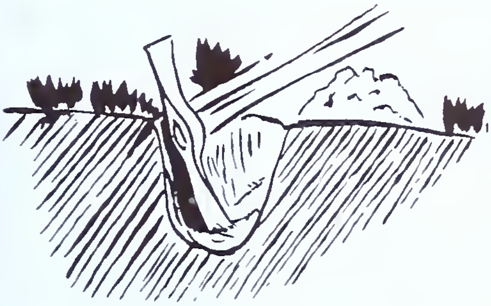
d. Keep soil moist.

When ready to plant seedlings, lift enough from the heel-in bed t partially fill a 10 or 12 quart water pail or bucket. Place a few inches o water in the bucket, add a handful of soil and mix thoroughly. Roo should be covered with this thin mud for protection. Never expose roo to the sun until ready to plant.

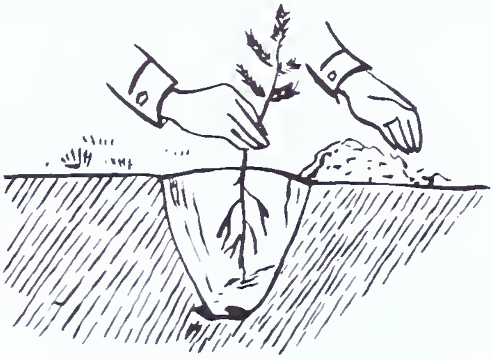
Planting is usually done by two men. One man digs the holes with sharp maddock, piling the soil on a pile at the edge of the hole. It is h job to properly space the holes for the type of planting desired.

The second man or planter follows with his bucket of planting stock. He plants one seedling in each hole as deep as it was in the nursery, spreads out the roots, and presses loose soil over and around them, packing it firmly with mallet, stone or hand. Do not pack grass, leaves or sod against roots. The balance of soil is then pushed into the hole and firmly packed with the heel of the planters shoe. Tree should stand upright and be firmly set.

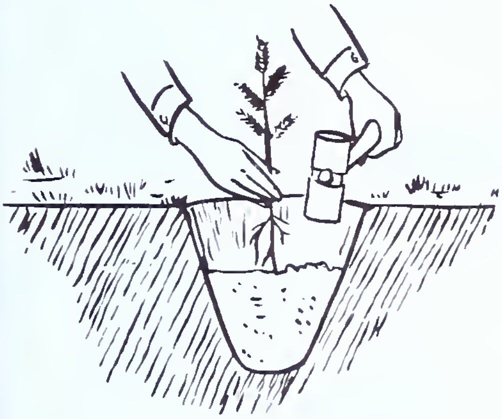
PLANTING PROCEDURE



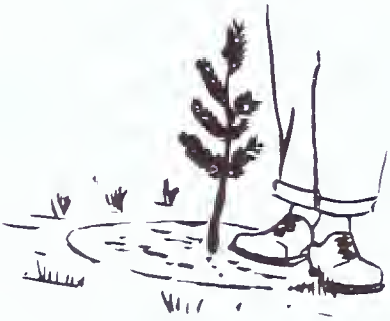
1. Dig Hole.



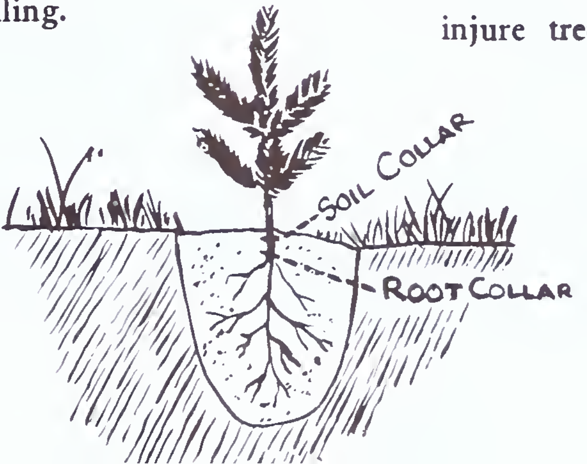
2. Hold tree in place and partly cover roots with soil.



3. Pack soil with mallet, stone or hand before final filling.



4. Fill hole with soil and press firmly with heel of shoe. Do not injure tree.



5. Tree properly planted.

Tree, Shrubs and Vines for Wildlife Areas

The following trees, shrubs, and vines produce food and cover utiliz by wildlife, and are recommended for open woodlot and field plantin

EVERGREEN TREES

RED PINE
WHITE PINE
SCOTCH PINE
HEMLOCK
AUSTRIAN PINE
BANKS PINE
NORWAY SPRUCE
WHITE SPRUCE

OTHER TREES

WHITE OAK
RED OAK
BLACK WALNUT
SHELLBARK HICKORY
BLACK LOCUST
APPLE
CUCUMBER
MOUNTAIN ASH
PERSIMMON
TULIP POPLAR
MULBERRY
CHESTNUT (ASIATIC)

Note: Only the most common and valuable species are listed. Wh not grown by nurserymen, the landowner may obtain young plants transplanting from nearby thickets.

SHRUBS

The most important shrub species recommended for conservation plantings in Pennsylvania, and brief information relative to their maximum heights and preferred planting sites are as follows:

Species	Maximum Heights	Preferred Planting Sites
Multiflora Rose (Thorny type)	6-10′	Dry to well drained soils
Tatarian Honeysuckle	6-12′	Dry to well drained soils
Bicolor Lespedeza	9-12′	Dry to well drained soils
Autumn Olive	8-14′	Dry to well drained soils
Blackhaw (Viburnum)	15-20′	Dry to well drained soils
Filberts (Hazelnut Hybrid)	9-12′	Dry to well drained soils
Hazelnut (American)	6-9′	Dry to well drained soils
Gray Dogwood	4-8′	Dry to well drained soils
Bayberry	5-7′	Dry to well drained soils
Coralberry	4-6′	Dry to well drained soils
Privet (Regel or Amur)	10-15′	Only well drained soils
Silky Dogwood	8-12′	Well drained to moist soils
Arrowwood	10-12′	Well drained to moist soils
Highbush Cranberry	6-10′	Well drained to moist soils
Basket Willow	10-18′	Wet soils
Red Osier Dogwood	6-8′	Wet soils

On the better agricultural farms, Multiflora Rose should be planted only where regular farming practices will limit the possibility of its spreading to adjoining fields. It does not grow well in shade or on wet soils.

Other species adapted to special conditions, but difficult to establish or of less value in conservation plantings, are elderberry (American elder), flowering dogwood, sumac, blackberry, red chokeberry, black chokeberry, witch hazel, thornapple (Hawthorne) and choke cherry. These occur naturally on many farms and should be favored in border cuttings, etc. They may be successfully transplanted from one area on the farm to a wildlife planting if extreme care is used in lifting and transporting the stock.

VINES

Although few vines are available in local nurseries, the following produce food and cover for wildlife and should be included in conservatio plantings on the farm.

Species	Preferred Planting Sites
Fox Grape	Dry to well drained soils in full sun to full shade
American Bittersweet	Dry to well drained soils in full sun to half shade

SOURCE OF PLANTING STOCK

The Pennsylvania Department of Forests and Waters, Harrisburg, Pa. grows and sells millions of seedlings and transplants annually for reforestation and wildlife within the Commonwealth.

Seedlings may be purchased at $6.00, and transplants at $15.00 pe thousand plants, plus the express charges. The list of available species o planting stock and details regarding purchase may be obtained by writin direct to the Harrisburg address, or by contacting the nearest Distric Forester.

Note: Evergreen tree seedlings purchased from the Department o Forests and Waters cannot be marketed for Christmas trees but must b allowed to grow and reforest the area.

Local nurserymen who do not grow trees, shrubs and vines indicate on these pages, can usually refer the interested landowner to larger nurseries that will supply their requirements.

MARSH AND AQUATIC PLANTS

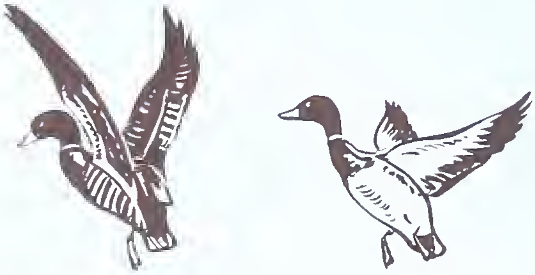
The following is a partial list, showing the more important marsh and aquatic plants that may be seeded or planted to improve food and cover for wild ducks, geese, and other wildlife that may be found around ponds, and marshes on the farm.

AQUATIC PLANTS	PLANTING INFORMATION
WAPATO (DUCK POTATO)	1200 tubers per acre in Marshy areas and mud flats.
WAMPEE (DUCK CORN)	Seed 10 lbs. per acre on swampy land or in acid water 6″-8″ deep. Use only where wood ducks are principal species.
WILD DUCK MILLET	Seed 20 lbs. per acre on moist soils and mud flats.
NODDING SMARTWEED and DOTTED SMARTWEED	Seed 40 lbs. per acre on exposed mud flats.
SAGO PONDWEED	Plant tubers or seed 30 lbs. per acre in 1-6′ of water. Hard fresh water or slightly brackish.
WILD CELERY	Plant 1200 tubers per acre on sandy or mud soils—Alkaline water 1½ to 5 feet deep.
WILD RICE	Seed 60 lbs. per acre in a few inches to 2 feet of water.

MARSH & AQUATIC PLANTS	PLANTING INFORMATION
GIANT BURREED	Seed 10 lbs. per acre in muddy spots and water less than one foot deep.
WATER SHIELD	700 plants per acre in 1-6′ of water.
THREE SQUARE BULRUSH	1200 roots per acre in less than 1′ of water.
HARD STEM BULRUSH	1500 plants per acre in less than 2′ of fresh water.
DUCK'S MEAT (SURFACE FLOATING)	5 bushels of plants covers 1 acre of water.

FULL PLANTING INSTRUCTIONS MAY BE OBTAINED AT THE TIME ORDERS ARE PLACED WITH THE SEEDSMAN

Migratory waterfowl are not of major consideration when managing the average farm for wildlife. Other publications will provide more detailed recommendations for developing food and cover on these water areas.



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